DOCUMENT RESUME

ED 105 211 95 CE 003 501

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TITLE Career Awareness K-6: Dictionary of Occupational Titles.
INSTITUTION Oklahoma State Dept. of Vocational and Technical Education, Stillwater. Curriculum and Instructional Materials Center.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE 74
GRANT OEG-0-72-4682(361)
NOTE 283p.; For related document, see CE 003 500
AVAILABLE FROM Oklahoma State Dept. of Vocational and Technical Education, 1515 West Sixth, Stillwater, Oklahoma 74074 ($3.25)

EDRS PRICE MF-$0.76 HC Not Available from EDRS. PLUS POSTAGE
DESCRIPTORS *Career Awareness; Career Education; *Catalogs; *Elementary Education; Employment Qualifications; Instructional Materials; Job Analysis; Jobs; *Occupational Clusters; *Occupational Information; Reference Materials; Vocational Development

ABSTRACT

The occupational handbook, although useful independently, is designed to be used with the career awareness guide "I Can Be Me from A to Z." The handbook is intended to aid pupils in elementary school to become aware of the occupational clusters they will be studying in more depth during junior and senior high school. The publication focuses attention on awareness of occupations rather than choice, exposing pupils to different life styles, career patterns, and educational experiences. It is organized according to the U. S. Office of Education's 15 occupational clusters: agribusiness and natural resources, business and office, communications and media, construction, consumer and homemaking education, environmental control, fine arts and humanities, health, hospitality and recreation, manufacturing, marine science, marketing and distribution, personal service, public service, and transportation. Each section offers an overview of the cluster and then provides a brief but detailed examination of almost 300 occupational titles. Each job description includes: general duties, history and future, work environment, training and education, qualifications, and advantages and disadvantages. (MW)

ED105211

ELEMENTARY

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Dictionary Of Occupational Titles

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STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION
STILLWATER, OKLAHOMA

CAREER AWARENESS
K-6
DICTIONARY OF OCCUPATIONAL TITLES

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These materials were developed and disseminated by Oklahoma State Department of Vocational and Technical Education Curriculum and Instructional Materials Center pursuant to Grant OEG-0-72-4682 (361) with the U.S. Office of Education under Part I-Curriculum Development in Vocational and Technical Education, Vocational Education Amendments of 1968, Public Law 90-576, by the Vocational Curriculum Management Center, Washington State Coordinating Council for Occupational Education, 1974.

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Resource Materials

ACKNOWLEDGEMENTS

Appreciation is expressed to those who contributed their time and talent to the development of the *Elementary Dictionary of Occupational Titles*

State Department of Vocational and Technical Education:

Dr. Irene Clements, Assistant Coordinator, Curriculum and Instructional Materials Center, for her counseling and assistance.

Dale Cotton, Public Information Officer, and Ronald Wilkerson, Assistant Public Information Officer.

Bob Rea, Media/Graphics Designer, Susan Bell and Dean Clark, Illustrators, for the drawings used in this publication.

Beth Parker, Sarah Mussett and Sheila Stone for editing this publication; Nancy Skach, Librarian, for assistance in research material; Linda Tapp and the Communications Center for typing.

The Printing and Publication Department for printing this publication.

Field testing sites in Oklahoma 1973-74:

Anita Craig--Blackwell
Dorothy McClung--Blackwell
Ofa Stephenson--Blackwell
Pam Scott--Bartlesville
June Hartpence--Bartlesville
Don Owens--Bartlesville
Elvia Edwards--Counselor--Millwood
Dorothy Resneder--Mulhall
Lynn Bevill--Norman
Kelly Taliaferro--Oklahoma City
Leta Stephensen--Lindsay
Lucille King--Lindsay
Dorylea Cunningham--Lindsay
Florence Dries--Stillwater
Anita Phillips--Greasy Cherokee Education Center

INTRODUCTION

This occupational handbook is designed to be used with the Career Awareness Guide "I Can Be Me From A to Z."

It is important that the teacher explain the use of this handbook to the pupils.

A thorough explanation will enable elementary pupils to perform independent research of occupations of their interest.

This handbook will aid pupils in elementary school to become aware of the occupational clusters that they will be studying more in depth during junior high and senior high school.

This publication should be used to focus attention on awareness of occupations rather than choice, to generate excitement rather than production, and to expose pupils to different life styles, career patterns, and educational experiences that enhance the individual and bring meaning into his life.

(NOTE: This book may be used without the Career Awareness Guide.)

RESOURCE MATERIALS

An analysis of fifteen occupational clusters identified by the U.S. Office of Education. Sherman/Denton, Texas: 1972.

Costella, Joan M. and Rita Parsont. *Concise Handbook of Occupations*. Chicago: Doubleday, 1971.

Hopke, William. *Encyclopedia of Careers and Vocational Guidance*, Volume II. Revised edition, 1974. Chicago: Doubleday, 1972.

Occupational Outlook Handbook. U.S. Department of Labor, 1972-73.

SRA Career Information Kit. Revised edition, 1974. 1972-73.

Agri-Business and Natural Resources

The need for food, clothing, and shelter has been man's basic problem throughout history. The problem is the same today; it has just become more complex with the increase in population and the many technical changes that have occurred in our society. To say the vast complex of agribusiness and natural resources is big business is to put it mildly; thirty to forty percent of our labor force in the United States is engaged in some aspect of food production, processing, and delivery to the American table. The production of oil, ores, coal, and minerals employs additional millions of workers.

AGRICULTURAL ENGINEER

Agricultural engineers develop efficient systems for the production, transportation, processing, and distribution of food and fiber. They are involved in the design of irrigation layouts, ponds, soil tillage tools, pesticide application, harvesting machines, and other systems to grow crops, fruits, vegetables, cotton, forest trees, and other plants. Because the systems they design operate at the point where machines meet life, the agricultural engineer must have an understanding of our natural resources (water, soil, air, and the sun) and of life itself.

History and Future--The first agricultural engineering project may have been the attempt by the ancient Egyptians to harness the floodwaters of the Nile, or it may have been an earlier effort. As a profession, however, agricultural engineering dates from 1907 when the American Society of Agricultural Engineers was organized.

To provide food for the growing population, agricultural engineers will continue to be in great demand for some years to come. They will be needed to help increase food production in their own country and throughout the world.

Work Environment--Some agricultural engineers work outdoors a good deal, planning or supervising installations of machinery or construction projects; others hold desk jobs that keep them indoors most of the time. Engineers spend little or no time in strenuous or dirty work.

Training and Education--A bachelor's degree is the minimum educational requirement for an agricultural engineer. High school courses should include mathematics, physics, chemistry, mechanics, social sciences, English, economics, and soil, plant, and animal sciences.

Qualifications--The agricultural engineer should have the ability to analyze, evaluate, and make accurate judgements. He should be able to convey his ideas fluently in both speech and writing.

Advantages and Disadvantages--The demand for engineers far exceeds the supply. Many engineering students are signed up for jobs while still in their senior year of college.

Engineers can look forward to high average earnings as they gain experience in their profession.

SOIL CONSERVATIONIST

The soil conservationist plans and develops coordinated practices for the protection of land and natural resources. He or she plans such soil management practices as crop rotation, strip cropping, contour plowing, and reforestation, as well as soil erosion control as related to soil and water conservation.

Soil conservationists supply farmers, ranchers, and others with technical assistance in planning, applying, and maintaining measures and structural improvements for soil and water conservation on individual holdings, groups of holdings, and on water sheds.

Farmers use this technical assistance for protecting land against soil deterioration; rebuilding eroded and depleted soils; improving cover on crop, forest, pasture, range, and wildlife land; conserving water for farm and ranch use; and reducing damage from flood water and sediment in draining or irrigating farms or ranches.

History and Future--Farmers have always been faced with land unsuitable for cultivation. Remedies were developed by the owners themselves through the limited scientific knowledge of the times.

Employment opportunities are good. The profession will expand because government agencies, public utility companies, banks, and other organizations are becoming interested in conservation and are adding conservationists to their staff.

Work Environment--Most soil conservationists are employed by the federal government. The average work week is forty hours. Most of the work is outdoors. There can be occasional travel.

Training and Education--A bachelor's degree with a major in soil conservation or a related agricultural science is necessary.

High school students interested in soil conservation should elect a college preparatory program and take as many courses in science and mathematics as possible. Some summer experience on a farm is desirable.

Qualifications--The soil conservationist must be able to accept responsibility.

Advantages and Disadvantages--Those who have unusual aptitude have good chances of advancement to higher salaried technical administrative jobs.

HORTICULTURIST

The horticulturist develops new or improved varieties of orchard or garden plants which will have a higher yield quality, nutritional value, resistance to disease, or adaptability to climate or soil. He also tries to find better methods of growing, harvesting, storing, and transporting horticultural crops.

Horticulturists usually specialize in either a specific plant or a particular technical problem, such as plant breeding.

History and Future--New graduates with a bachelor's or master's degree will find many opportunities to work in junior level positions or as research assistants. The employment outlook, particularly for those holding a doctoral degree, is excellent.

Work Environment--The work is varied, pleasant, and interesting. Jobs are available out-of-doors, in greenhouses, offices, and laboratories.

There is some physical activity involved, such as walking, stooping, bending, reaching, handling, and grasping.

Training and Education--In high school, a college entrance program should be considered, including courses in chemistry, biology, mathematics, and vocational agriculture.

Qualifications--Initiative, curiosity, patience, persistence, interest in working with plants, and a liking of the out-of-doors are necessary qualifications.

Advantages and Disadvantages--This career offers personal satisfaction in seeing one's effort resulting in the improvement of food and plants for human betterment.

There is equal opportunity in this career field for both men and women.

DAIRY PRODUCTION TECHNICIAN

There are two main areas for employment in the field of dairy production. The first area is in actual farm operation (owner, manager, herdsman). The second area of work is in an agriculturally related business or in one of many organizations the dairyman hires to perform specific services for him.

Most dairymen do not mix their own dairy rations but rely on technicians to do it for them; practically all dairymen are using highly selected animals in their breeding programs and call on technicians to provide advice concerning selection, as well as to perform the insemination service.

Dairy production technicians can also go into sales work, selling special agricultural products and services to dairymen.

History and Future--For many years dairying was considered a summer industry. Cows were milked starting in the spring when they calved and continuing to the winter when they were simply allowed to go dry.

The field of dairy production technology is vast with a great diversity of employment opportunities. As research and science improve the technology of production, there will be even more change and opportunity for employment.

In the early 1970's two to four jobs were available for each graduate, and the indication is that the ratio will not change.

Work Environment--The technician must be prepared to work every day of the week. He is at the disposal of the cow, who must be milked twice daily, who gives birth anytime, and who can need care any hour of the day.

Most of the work is out-of-doors, although there are jobs available in the laboratory.

Training and Education--High school graduation is a prerequisite for becoming a dairy production technician, and more and more dairy farms and agriculturally related businesses are looking for people with at least two years of college. High school courses should include biological and earth sciences, mathematics, vocational agriculture, chemistry, and English.

Qualifications--The dairy production technician should have a real desire to work with animals. He should have a curious mind and stay informed on the latest developments and newest methods as they emerge in the industry. The technician must be able to communicate both verbally and in writing in order to be able to work effectively with others.

Advantages and Disadvantages--Fringe benefits include room and board, laundry, milk, and sometimes meat. In addition, technicians are entitled to the same basic workmen's compensation coverage and health insurance provided by other businesses. Social security is the only retirement system. Vacation time and personal leave time are provided.

FORESTER

A forester is an expert on the interrelationship of forest soil, air, water, trees, and other plants, people, wildlife, and domestic animals. He directs land surveys, road construction, and the harvesting and planting of trees. He knows the economics of forestry. He is skilled in preventing and stopping damage to forest resources from insects, diseases, and fires. He plans and prescribes forest land uses and practices.

History and Future--The first professional schools of forestry were started in the late 1890's.

The growth of professional forestry was slow at first. By 1912 only 500 men had had formal training in forestry.

The future for foresters appears to be excellent. Employment prospects are good now. The demand for foresters is expected to grow. There is a growing need for forest land to be used for recreational purposes and as a means of conserving water and soil.

Work Environment--A forester's regular workweek is forty hours, but when emergencies occur foresters must put in extra time coping with fires, floods, and storms. The amount of work also varies with the seasons. Spring and summer are seasons when the forester has a number of extra duties. He must work long hours then, even though he usually has part-time helpers.

Training and Education--The forester needs a good education. In high school the prospective candidate should place special emphasis on English, mathematics, and science. The professional forester needs at least a bachelor's degree in forestry. Many have either a master's or a Ph.D.

Qualifications--A forester needs initiative, self-reliance, and the ability to work well with people. Scientific curiosity, reasonably good health, and a genuine liking for the out-of-doors are important.

Advantages and Disadvantages--There are many advantages to be found in working as a forester. It is a good job for the person who loves the outdoors and enjoys working on his own. The occupation is relatively secure, and the person working in it can feel that he is making a worthwhile contribution to society.

Sometimes the forester finds himself in situations of great hardship or danger in which he has no one to depend on but himself. He has to be intelligent, resourceful, and firm against any impulse to panic.

FOREST AND FOREST PRODUCTION TECHNICIAN

The forest and forest production technician may work in the areas of forest management preparing surveys and maps, timber production, recreation wildlife, forage management, or water regulation. Some are involved in protecting forests from insects, disease, or fire. Some work in the research or testing of various products designed to improve forests or lumber. Still others work in lumber yards, sawmills, veneer mills, logging operations, furniture companies, or wherever technical knowledge of wood or a wood base product is needed.

History and Future--Forestry is a relatively new profession. However, the employment outlook is excellent.

Work Environment--Forest technicians normally work a thirty to forty hour week, but working hours may include occasional weekends or evenings, particularly for those in round-the-clock specialties such as recreation or firefighting.

Training and Education--A high school diploma is necessary, and a prospective technician should attend a junior or community college or technical institute, earning an associate degree. Courses include mathematics appropriate to forestry, communications, botany, engineering, marketing and business, manufacturing processes, and specific technical forestry courses.

Qualifications--Forest technicians should be able to communicate well with others and to apply theoretical knowledge to practical problems. Physical stamina, ability to work with the hands, and enjoyment of the outdoors in all kinds of weather is necessary for some positions.

Advantages and Disadvantages--There are opportunities everywhere in the country for forest technicians.

GEOLOGIST

The geologist is largely concerned with locating and obtaining physical data and material. This may necessitate the drilling of deep holes in the earth to obtain samples, collecting and examining materials found on or near the surface, and possibly the preparation of geological maps. In the laboratory the geologist makes studies of the collected material for which he may have had neither time nor equipment in the field. Then, he writes reports on his work for use by future geologists.

History and Future--The employment outlook is excellent for men and women with graduate degrees. Many new fields are appearing where knowledge of geology is combined with another science, as in astrogeology.

Work Environment--The geologist's work may be physically demanding, involving considerable time in the field and living a camper's life.

Although the practice of geology, because of its often strenuous nature, has appealed primarily to men, some women enter the profession each year. They find jobs as teachers, laboratory research workers, technical writers and editors, librarians and sometimes as field geologists.

Training and Education--The minimum education necessary for most geologists is a master's degree.

A prospective geologist in high school should take courses in mathematics, science, English, and at least two modern foreign languages.

Qualifications--The geologist must be able to get along well with many kinds of people. He must have the ability to visualize things in three dimensions. He should also be a keen observer.

Advantages and Disadvantages--The geologist may be separated from his family for periods of time, but the ease of transportation is making these periods shorter. The chance to see and learn new things and the necessary mental stimulation all add zest to the work. The financial compensation is good.

FARM CROP PRODUCTION TECHNICIAN

The farm crop production technician plans, plants, cultivates, cares for, harvests, and markets field crops, such as grain and cotton, for commercial purposes.

Nearly everything used on a farm is now purchased away from the farm, such as seed, fertilizer, pesticides, machinery, fuels, and general supplies. Companies selling these products need farm-trained and farm-oriented technicians who can understand the buyer's farm problems and needs. These companies also need technicians to assist in research. The farm machinery technician tests and recommends improvements or adaptations in machinery designed by company engineers. Some technicians work closely with farmers supervising the production of a crop.

History and Future--Perhaps one of the most important discoveries in history was the discovery that plants could be grown from seed.

The word "agriculture," which is another word for farming, comes from the Latin words meaning "field" and "till."

The student exploring a career in crop production technology should not be misled by the fact that the number of farms is decreasing. Food production in all of its facets should continue to provide good employment opportunities throughout the coming year.

Work Environment--Many technicians are required to work out-of-doors a great deal of time. A laboratory technician's work involves exacting systematic procedures. Facilities are generally clean and well lit. An inspection technician's work may involve long hours during harvest season. Those involved in sales work may spend considerable time in travel.

Training and Education--The student who wishes to go on to a junior college should have a good high school background in mathematics and science. He should complete as much vocational agricultural mechanics as possible. English is also important because much of the work involves careful and accurate record keeping and the ability to communicate with others.

Qualifications--The prospective technician should like outdoor work and should be able to adapt to extreme weather conditions. There may be certain seasons of the year when he is required to work long hours under considerable pressure to get a crop harvested or processed at the right time.

Advantages and Disadvantages--The technicians who work on the farms are often provided with free housing.

Those who have had experience in several jobs in the industry may advance to managerial levels more rapidly than those who have not.

FISH AND WILDLIFE TECHNICIAN

The fish and wildlife specialist studies natural animal resources to determine the best method of conservation and propagation. He recommends a limitation or holiday on fishing or hunting of any species in danger of extinction. He encourages growth of fish and wildlife by reducing disease and stream pollution, restoring vegetation and other food sources, and encouraging breeding.

Fish and wildlife specialists also serve as park naturalists and park rangers. Naturalists study wildlife native to their area, preserve scientific specimens, collect records, plan museum exhibits, and conduct study tours.

The ranger uses a background of wildlife knowledge to assist in protecting and managing both animals and park visitors and in presenting a clearer picture of the natural inhabitants of the area.

History and Future--Early American settlers found an abundance of fish, game, and other wildlife. Indeed, products of their fishing and hunting sufficed to keep the early colonists alive.

By the early nineteenth century most of the states had adopted regulations protecting their fish and wildlife. However, these laws were not enough to counteract the destruction of natural life. At the same time, the development of farms, villages, and industries removed numerous species from their natural state and traditional feeding grounds. Those that escaped the hunter's bullet may have died from lack of nourishment due to the farmer's plow.

Positions for fish and wildlife specialists may result from increased attention paid by commercial organizations.

Work Environment--The work is often seasonal. Overtime or weekend work during certain times of the year is common.

While some specialists work in clean and comfortable laboratories in major metropolitan areas, many employees work in remote locations.

Qualifications--The specialist must possess good judgment. Keen observation and interest in wildlife are important. The specialist should possess a good writing skill for preparing frequent reports demanded of him.

Advantages and Disadvantages--Because of the relatively small number of persons employed in fish and wildlife positions, advancement possibilities are somewhat limited in most states.

Relatively few opportunities exist for women as specialists, as the rugged outdoor life necessitates the use of men (in the opinion of most employees).

ENTOMOLOGIST

The entomologist works primarily in research, control, and teaching. He or she is concerned with the study of insects, reduction of some harmful species, and the aiding of helpful species to survive and multiply. The researchers study in laboratories and in their natural environments. It may be necessary for them to travel in the United States and all over the world.

Entomologists are developing nonchemical controls of insects, such as the development of insect-resistant plants and the use of birds and harmless insects to combat the harmful varietes.

History and Future--Entomology is a relatively small field of about 6,000 professionais. It is expected that there will be more job opportunities than there will be qualified entomologists to fill them.

Many women find satisfying careers in the field of entomology.

Work Environment--Working conditions vary considerably in entomology. Outdoor work often requires considerable physical activity in all kinds of terrain. In the laboratory, the entomologist works with live insects and other forms of life, with chemicals, and with all kinds of science equipment and supplies.

The entomologist in teaching works with groups of students in lecture and discussion and with individuals in personal conferences.

Training and Education--The prospective entomologist should attend a college or university offering a broad background in biology and other science specialties. With a bachelor's degree one would work in a less technical branch of entomology, such as being an assistant or in routine control work.

The master's degree is considered the minimum program for the professional entomologist. However, the Ph.D. degree is recommended for those interested in college teaching and research.

Qualifications--An aspirant should have above average general ability in a college aptitude test, be able to read above his grade level, and be able to obtain very good grade marks in high school subjects, especially science.

Advantages and Disadvantages--Entomology is a growing field with very good employment opportunities. The professional entomologist can work in a variety of conditions, such as teaching, research, writing, and control work.

Six to eight difficult and expensive years of college work are required for the best background. In research, long hours of frustrating work may sometimes end in little or no results, which is often true in science-related professions.

MINING ENGINEER

The mining engineer's primary duty is one of exploration and production of mineral materials from the earth's crust.

The engineer is responsible for the planning and the sinking of shafts and the digging of tunnels in the safest and most economical manner. He must choose the best method and equipment to use in extracting, recovering, and treating the ore. He must design or select the best processing equipment for the job to be done. He purchases equipment and supplies and supervises and assists in the erection of plants.

The mining engineer directs or supervises the removal of ore from the mine. He is responsible for the maintenance of the mine, for the safety of the miners, and for the overall smooth running of the whole mining operation.

History and Future--The Phoenicians were the first major users of metal and had developed efficient mining systems and organizations for mine operators by 1200 B.C.

The modern history of mining began in the middle of the nineteenth century. There has been an extremely rapid growth of metal mined, together with increasing demands for all kinds of mine products.

The outlook for mining engineers is expected to be favorable through the next decade. The number of new college graduates with degrees in mining engineering is currently not high enough to replace those who leave the profession to retire or transfer to another field.

Work Environment--Mining engineers employed by industries usually work at the location of the mine. Although the engineer may have an office, he will spend much of his time dressed in field clothes and working in the open or underground. He might live and work in a small community in an out-of-the-way place, but if he is engaged in management, sales, teaching, research, or consulting he is likely to live near or in a large metropolitan area.

Training and Education--Preparation for a career in mining engineering should begin in high school with algebra, geometry, trigonometry, physics, chemistry, geography, and mechanical drawing. English is a must and a good background in social studies is important.

Qualifications--The engineer must be physically fit, have a liking for the out-of-doors, be adaptable to varying conditions, and be able to accept life away from the normal environment. He should have a good command of written and spoken English and be willing to work long hours when necessary.

Advantages and Disadvantages--There is always some danger in working around heavy machinery, and in a shaft mine there are additional problems. The physical conditions, lack of natural light and air circulation, mean that special precautions must be taken.

Valuable experience in different mines and working with different metals and ores in various parts of the United States or abroad equip the engineer for responsibility as a supervisor, administrator, or sales engineer.

MINER

There are varied tasks for miners. One drives underground openings to extract coal, ore, or rock. Another drills holes in the working face of the ore or rock and inserts explosives to break up the mass.

Miners operate the cutting machines, drilling machines, loading machines, and continuous mining machines that perform most of the work in underground coal and potash mines. In these and all mines there are power shovels, loading shovels, drills, bulldozers, and huge trucks that enable the miner to work efficiently with a minimum of effort and a maximum of safety.

History and Future--American Indians used the surface coal to make carvings or paint their skins black. Only the Hopi Indian who lived in what is now Arizona burned coal for fuel and for firing pottery.

Coal supplied more than half the United States' energy needs as late as 1943. It now provides a little more than one-fourth. Nevertheless, the industry is progressing again.

The future for the coal industry looks good. Industry and government are expanding their investment in research that is expected to provide more uses for coal. Because of increased mechanization, however, most of the demand will be for mining engineers and skilled labor.

Work Environment--Today the average workweek is about forty hours. The miner gets time and a half for overtime and Saturday work, double time for Sunday work, and triple time for work on holidays.

The first ten states according to the number of men engaged in mining are Texas, West Virginia, Louisiana, Pennsylvania, Oklahoma, California, Kentucky, Illinois, Ohio, and New Mexico.

Training and Education--A high school education is valuable and often required, for the miner of today must be a skilled technician capable of operating or maintaining complex, expensive equipment.

Courses in vocational schools should cover equipment maintenance, electricity, machine operation, mine gases, explosives, and mining law.

Qualifications--The miner must be in good physical condition. Working underground in fairly close quarters calls for a cool head and the ability to think quickly.

Advantages and Disadvantages--Coal mining today is a much more attractive occupation than it used to be.

Company towns are mainly things of the past. Improved roads, good transportation facilities, and higher wages have helped eliminate them, and miners and their families are no longer isolated in strictly mining communities.

Although certain hazards are inherent in the mining industry--falls, explosions of firedamp and coal dust, cave-ins--the coal industry over the years has made much progress in accident prevention. Progressive coal companies realize that a good safety program is an integral part of the production plans. Also, all states where there is commercial mining have a state department of mines that inspects and controls mining operations. The Federal Bureau of Mines also enforces rigid safety laws. This bureau has sections concerned with safety, mine inspection, and miners' health.

GEOPHYSICIST

The geophysicist studies the physical aspects of earth, including its atmosphere and hydrosphere, utilizing the principles of physics, mathematics, and chemistry.

The geophysicist analyzes data to compute the shape of the earth, eliminates the composition and structure of its interior, and determines the flow pattern of ocean tides and currents. He studies the physical properties of atmosphere, helps locate petroleum and mineral deposits, and investigates the origin of glaziers, volcanoes, and earthquakes.

Geophysics is a broad and active field divided into many subfields.

Geophysicists who work in geodesy study the size and shape of the earth and the variations in the pull of gravity. They set up a network of points and elevations above sea level, establishing bench marks for reference purposes.

Seismology is the study of earthquakes by which geophysicists learn most of what is known of the interior of the earth.

Oceanography is the scientific study of the sea. From specially equipped ships, scientists study the currents, content, and bed of the ocean.

Hydrologists measure rivers and streams and study underground supplies of water and the occurrences, behavior, and disposition of water on the under land.

The profession of geophysics covers a broad spectrum of studies from the core of the earth to the atmosphere of Jupiter.

History and Future--The demand for geophysicists is growing rapidly. The number of new graduates will fall far short of the needs of employers. The geophysicist is in demand to find new reserves of critical radioactive minerals for atomic energy. The natural environment has been modified by man's presence, so that the work of environmental scientists has increased dramatically.

Work Environment--The work may be physically demanding. Considerable time may have to be spent in the field away from family. Many hours are spent working in the laboratory and preparing reports. Some jobs involve frequent relocation, both within the U.S. and in various foreign countries.

Training and Education--A bachelor's degree is the minimum required education. A good background in high school physics, chemistry, and mathematics is important. Graduate degrees are becoming increasingly important in competing for the best jobs.

Qualifications--The prospective geophysicist should have an aptitude for geology, physics, chemistry, and mathematics and should also like to work outdoors.

Advantages and Disadvantages--Women are welcomed into geophysics as equals. There are no barriers to advancement of women in any area of geophysics, and many women occupy responsible positions. The American Geophysical Union has had women officers, and some of its most distinguished members are women.

PETROLEUM ENGINEER

The petroleum engineer keeps in touch with the field party, is an expert in fossils, and often goes along on field trips. After discovery and exploration of a potential oil field and after the oil company decides to drill, he takes over.

The engineer must know the entire field, so that he can decide how many wells should be sunk, how they should be sunk, how they should be spaced, and how much time should be allowed for drilling operations.

After the well is completed, the petroleum engineer decides what method to use to get oil and gas to the surface. He studies subsurface rock layers penetrated by the drill, estimates the quality of petroleum present, and decides how it can be recovered more easily.

Not all petroleum engineers work for oil companies. Some work for manufacturers, designing and testing new oil field equipment. Some specialize in the economics of petroleum engineering, evaluating oil properties and providing their employers with information to guide their future operations. Some are self-employed.

History and Future--The outlook for petroleum products is excellent. Demand for petroleum products is expected to keep on rising rapidly.

Exploration for petroleum will continue, but many oil men believe that the most important sources of oil lie in offshore areas, in the Arctic, and in fields already discovered. The petroleum engineer will be a key man in studying these sources and applying secondary recovery methods.

Work Environment--The petroleum engineer works outdoors in all kinds of weather and in all kinds of places. The engineer may have to live in a trailer or camp in out-of-the-way places in unusual climates. He may work on platforms built above the water or on barges.

Training and Education--The usual requirement for a job as a petroleum engineer is a college degree. In high school a college preparatory program should include courses in mathematics, physics, chemistry, shop work, and mechanical drawing. English composition is important, for clear written and oral reports are required of engineers. Social studies, including economics and foreign languages, is helpful.

Qualifications--The petroleum engineer must be able to work and get along with all kinds of people. He has to be a good supervisor of production crews. Ingenuity, good judgment, and resourcefulness are required for solving various engineering problems. The engineer must develop a practical, common sense knowledge of cost because his company expects him to get the most oil and gas at the lowest cost.

Advantages and Disadvantages--Earnings of engineers in the petroleum industry are generally above the national average, and such benefits as pension plans, insurance, and paid vacations are common.

Petroleum engineers can eventually move up to administrative positions. Many trained engineers become top executives.

FARMERS

Farmers raise crops such as corn, wheat, tobacco, cotton, vegetables, and fruits. They may specialize in some phase of producing animals or poultry mainly for food, or they may maintain herds of dairy cattle for the production of milk. While some farmers may combine several of these activities, most specialize in one specific area.

The crop farmer grows corn, wheat, cotton, tobacco, peanuts, or specialty crops, such as peas, beans, beets, soybeans, potatoes, fruits, and berries.

The hay farmer grows hay. He must be able to judge the exact time for mowing which will yield the best crop in terms of such factors as stem toughness, leaf loss, and the growing season of subsequent cuttings.

The livestock farmer generally buys his calves from ranchers who breed and raise them. The livestock farmer's work is basically to feed and fatten young cattle, and generally he raises his own corn and hay in order to cut feeding cost.

The sheep rancher raises sheep primarily for their wool. Large herds are maintained on range land in the western states. Since large areas of land are needed, the sheep rancher must usually buy grazing rights on government owned lands.

The dairy farmer is concerned with the production of the maximum amount of high-grade milk; he also will raise corn and grain in order to provide feed for his animals in order to reduce cost.

The poultry farmer does not hatch his own chicks but buys them from commercial hatcheries. The chicks are then kept in brooder houses until they are seven or eight weeks old and are then transferred to open pens or shelters. At six months the hens begin to lay eggs, and roosters are culled from the flock to be sold for meat.

History and Future--Farming is an ancient occupation, going back before the beginning of recorded history. Before farming began, man was a hunter. Tribes roamed from area to area, killing animals for food, clothing, and shelters and picking whatever wild berries, nuts, and fruits that might be found. As the population grew, rudimentary efforts began to tame wild animals and to cultivate food plants in order to provide a more constant source of food. Goats and sheep were raised in mountainous or hilly lands and were moved from one grazing spot to another.

The big breakthrough in farming came when it was realized that seeds saved through the winter could be planted in the spring and that planned crops could be raised and harvested. There is evidence that wheat was cultivated in Mesopotamia (now Iraq) as early as 4700 B.C. and that cotton, too, was used by ancient people in producing cloth. Peas, beans, rice, and barley were also some very early crops.

Farming methods and implements were crude. Oxen dragged forked sticks through the ground to break up the soil; scattered seeds were pressed into the earth by having sheep driven over the land; women and children often sat in the fields guarding the newly planted seeds from scavenging birds.

In colonial America alomst 95% of the people were farmers, planting such crops as Indian corn, wheat, flax, and further South, tobacco. With the exception of turkeys, all of the livestock raised was brought over from the Old World. Chickens were brought by Spaniards in the sixteenth century and by the English colonists to Virginia and Massachusetts. Hogs, cattle, sheep, and goats were also imported. Hay was raised to feed the farmer's livestock, and just enough other crops were raised to supply the farmer and his family throughout the year.

The invention of farm machines in the 1800's, such as the reaper, the threshing machine, the steel plow, and the two-horse cultivator, enabled the farmer to put a great deal of land under cultivation, and the widespread sale of farm products began. At the beginning of the twentieth century, the tractor was developed, and a new and important crop, soybeans, was imported from the Orient and widely planted and processed.

Along with the introduction of many labor-saving farm machines came new and improved methods of soil conservation. The use of fertilizers, contour farming, and strip rotation greatly increased the productivity of the land and at the same time preserved it. The Department of Agriculture, which was created in 1862, and the growth of agricultural colleges with their various extension services combined to make the farmer more knowledgeable, productive, and efficient in his use of land and livestock.

Farming is becoming big business with fewer but larger farms the rule. Unskilled workers will find it hard to get jobs; the outlook is better for workers who acquire skill in operating and maintaining farm machinery.

Work Environment--The farmer is outdoors most of the time regardless of weather conditions. Long hours and hard manual labor make excellent health and strength necessary. During planting and harvest seasons, he will work very long and irregular hours with few breaks in the routine. Even during the cold winter months he must repair machinery and buildings.

Training and Education--There are no specific educational requirements for the crop or animal farmer, but the farmer should have a knowledge of the principles of soil preparation and cultivation, disease control, machinery maintenance, as well as knowledge of business practices and bookkeeping.

High school courses should include algebra, geometry, carpentry, accounting, and English. Extension courses should also be taken in order to keep abreast of all new developments in farm technology and science.

Qualifications--All farmers, regardless of their specialty, should enjoy being outdoors and should be in excellent physical condition.

Advantages and Disadvantages--The farmer is his own boss. He enjoys the wonderful sense of inner security that comes from treading a man's own acres. He can work in the outdoors. He has the joy of seeing plants grow and prosper.

Farming provides a deeply rewarding life that contributes immeasurably to mankind's well-being.

POULTRYMEN IN INDUSTRY

In the field of poultry product technology, there are opportunities for men and women in the departments of research and development, quality control, and technical service.

The sanitarian sees that all poultry products meet the requirements of customers and regulatory agencies.

The scientist performs basic research or applies basic findings to practical problems. It is in the laboratories of the poultry industry that the team effort of scientists results in new product development.

The hatchery manager is responsible for transforming millions of eggs into chicks, ducklings, and turkey poults. He organizes and supervises all activities of the hatchery.

Technical sales and service personnel assist producers and managers of production units and help design efficient systems for production. They also help to bring together the activities of the producer with other parts of the industry and government agencies.

The nutritionist develops special diets for poultry or specific farms. He supervises all laboratory operations for analyzing feedstuff, formulating the new diets, and testing them. Geneticists design and develop the foundation stock for all types of poultry; the stock will then have the necessary characteristics for breeding profitable birds. With the help of the computer, they can predict the results of specific mating with a high degree of accuracy.

History and Future--The poultry industry got its start in New England and on the North Atlantic coast, but today it is scattered throughout the country.

The demand for graduates with poultry background exceeds the supply available.

The industry needs men and women who are able and willing to work hard, handle responsibility, and work with new ideas.

Work Environment--Working conditions vary in different areas. Most poultry industries are located in Long Island, Minnesota, California, Iowa, and Georgia.

Training and Education--Preparation for a career in poultry science should include courses in chemistry, microbiology, and engineering.

In high school courses should include science, math, and English. Membership in the Future Farmers of America or a 4-H club is a helpful prerequisite.

A college education is a distinct advantage. The work is so specialized that the prospective poultryman needs college courses in poultry breeding, management, marketing, and nutrition.

Qualifications--A prospective poultryman should be in good health and able to stand hard work. Attentiveness to detail and an inclination toward neatness and order are also desirable qualities.

Advantages and Disadvantages--The incomes of poultrymen in industry are fairly stable because they produce under contract. Contract production is more widespread in poultry industry than any other major type of farming.

BUTCHER

Butchers cut up large pieces of meat and trim away any excess fat and bone. They may also prepare meat products, such as sausages, hams, and corned beef. They must use a variety of tools, including knives, saws, and cleavers. Some butchers are also responsible for keeping an inventory record of all meat going in and out of their area and for ordering new stocks of meat and other supplies.

History and Future--The employment outlook is excellent. Thousands of entry jobs for meat cutters will be available during the next decade to replace experienced workers who retire, die, or transfer to other occupations.

Work Environment--Butchers generally work a thirty-five to forty hour week with extra pay for overtime. Work surroundings are usually well lighted and well ventilated. The job requires much heavy lifting and standing. There can be unpleasant odors and sudden temperature changes when entering and ieaving refrigerated areas.

Training and Education--High school or vocational school graduation is preferred but not always required. A number of vocational schools offer courses or programs in meat cutting. Butchers usually learn their trade through on-the-job training or an apprenticeship program, both of which take two to three years to complete.

Qualifications--Prospective butchers must be in good health, clean, have enough physical strength to lift heavy pieces of meat, and have good manual dexterity.

Advantages and Disadvantages--Skilled butchers can advance through promotions to supervisory positions in larger establishments or by going into business for themselves.

FOOD PROCESSING WORKERS

The first step in the food processing operation consists of cleaning and washing the raw food. This is done by the washer operators who screen, air blast, or wash the raw products.

Machines sort the products for size; hand sorters examine them for ripeness and defects. Hand trimmers or machine operators trim the products of waste and blemishes. Hand peelers may remove peel or skin. The food may be handled by machines that cut, slice, dice, halve, or peel it.

Filling machine operators regulate the amount of food going into each container.

After the day's processing is over, all the machinery must be thoroughly cleaned, washed, and sanitized so that it will be immaculate for the next day's work.

History and Future--The outlook for the processing industry is bright, but prospects are not particularly good for unskilled workers. More and more machines are taking over the work of human hands. With this increasing mechanization comes a need for skilled machine operators.

Work Environment--Because sanitation is of primary importance in food processing, plants are clean and well lighted.

Some plant operations must be performed at low temperatures, for which employers provide special clothing.

Training and Education--There are no particular education requirements, although workers with at least a grammar school or a high school diploma are preferred. Employees are trained on the job.

Qualifications--Good health, good eyesight, and manual dexterity are the essential factors. All workers who handle food must furnish a health certificate from their doctors.

Advantages and Disadvantages--Many small plants operate only during harvest time and close down for the rest of the year. Other plants process foods available throughout the year, such as meat and fish, and provide steady employment.

Advancement opportunities for unskilled workers are not good, although some supervisory positions are available. Chances are better for machine operators, who may begin operating simple machines and move up to more complex operations or supervisory work.

AGRIBUSINESS TECHNICIAN

The agribusiness technician provides farmers with financial credit, power, fuel, transportation services, farm and supply services, and contract marketing and processing.

The agribusiness technician may work as a part of personnel management for a large corporate farm or dairy with the authority to hire and fire employees, coordinate work layout with the farm manager, and assume the responsiblity of the entire structure of salaries.

The agribusiness technician may work with a credit institution soliciting the business of farmers and agricultural businessmen to make appraisals of real estate and personal property, to organize and present loan requests, to close loans, and to service those loans with a periodic review of the borrower's management performance and his financial status.

History and Future--Only a few years ago the farmer thought of himself as being nearly self-sufficient. Today he relies heavily on agricultural business for services that were unheard of when he started farming. This field has grown so rapidly that it is virtually a new area of endeavor for every generation. In the early 1970's there were approximately five people employed in agricultural business for every full-time farmer in the United States. The ratio continues to widen as more and more companies and organizations offer more and better direct production services.

The employment outlook for this profession is highly favorable. As small farms give way to large corporate entities, the technician's services will be in increasing demand. The large farms will require people highly trained in very specific areas to handle the vast and diversified management operations. Since the demand for such people so far exceeds the supply, it is expected that employment opportunities will be high during the next decade.

Work Environment--Because the field of the agribusiness technician is so large, working conditions vary greatly. Those who work in the area of sales will be traveling a good deal. The job may require a few nights spent on the road or a few weeks spent out of the country. Those who work for banks or offices will usually work in clean, pleasant surroundings. The specialist who goes into farm management or who owns his own farm will need to work outdoors in all kinds of weather.

Training and Education--A high school diploma is an absolute necessity. Courses during high school should include English, social studies, laboratory science, mathematics, and as many agricultural and business courses as possible.

After completion of high school, it is necessary to train in a two-year agricultural or technical college.

Qualifications--The technician must be willing to get his hands dirty when necessary. He must be able to establish rapport with both the professional staff or owners he works with and with the laborers who work for him. He must always be well informed on his specialty and must keep his information current.

Advantages and Disadvantages--An agribusiness technician will often be confronted with problems requiring careful thought and decision. As a consequence, he must be able to remain calm when things get hectic, to make sound decisions, and then to stand by his decisions in the face of possible disagreement. It is a profession which requires initiative, self-reliance, and the ability to accept responsibilities which inevitably draw blame at times of failure, as well as substantial rewards for successful performance. For those with qualities of leadership and a strong interest in agricultural business, it can be a challenging, exciting, and highly satisfying profession.

• FARM EQUIPMENT DEALER

The dealer must be a wise businessman, a top-notch salesman, an efficient manager, and an effective supervisor of personnel. If he is running a large enterprise, he will spend most of his time overseeing operations as general manager. In a smaller organization, he personally will do all or most of the selling, servicing, and paperwork.

Arranging attractive displays of equipment is part of the dealer's job. As a rule, the dealer conducts sales meetings with his staff, arranges special sales events, and coordinates advertising and promotion. He must be sure the sales and service staff are taking good care of all customers, and he must be alert to sales possibilities stemming from the changing of the farmers in his community.

The dealer must be able to evaluate used machinery that is taken in trade and see that each item is put into good condition for resale. The parts department is also very important in this operation. Checking inventory and ordering new stock are also part of his job.

History and Future--The first piece of equipment was probably nothing more than a sturdy stick used to break the earth. Today close to $4 billion worth of sophisticated farm equipment is sold annually in the United States and Canada.

The prospective farm equipment dealer should carefully study the local situation before he decides where to enter the business. If he goes to work for an established dealership, he should try to find one that is thriving. With ambition and good judgment, young people should be able to fill the need for modern, aggressive dealerships.

Training and Education--A college education offers the greatest prospects for success in operating a farm equipment dealership. However, there are no specific educational requirements for entering the farm equipment field, but, as in most jobs, the more formal training a person has the better qualified he is and the better are his chances for advancement.

Qualifications--The farm equipment dealer needs a pleasing personality and a knack for dealing with people. He must be courteous, tactful, and patient. Honesty and reliability are other vital characteristics for the equipment dealer.

Advantages and Disadvantages--The farm equipment dealer has all the advantages of a self-employed businessman. He chooses his own working methods and hires his own staff. The successful dealer usually works longer hours with less vacation than his employees, but one who enjoys being his own boss and building a prosperous business does not consider this a great hardship.

A farm equipment dealership can provide a pleasant and challenging career for a person who likes selling and working with machines and who does not care for big city life.

ARTIFICIAL BREEDING TECHNICIAN

The technician collects semen for artificial insemination. The methods of collecting semen with an artificial vagina or by electrical stimulation are of the greatest use.

The technician also inseminates the female farm animals using the semen from the male farm animal.

History and Future--It has been reported that the Arabs used artificial insemination in horse breeding three or four thousand years ago.

After World War I, the Russians, being short of good stock, began an extensive study of the techniques and practical use in such a breeding program. Interest has spread rapidly during recent years and extensive research has been developed in many countries. The progress made and the success of the practice is indicated by the nearly eight million cows bred by this method in the United States in 1962.

Work Environment--The technician works with clean sterilized instruments. Most of the work is performed outdoors.

Training and Education--A high school diploma is nearly always required. The high school curriculum should include courses in science and agriculture.

Qualifications--The technician must have physical stamina and good health. To be successful the technician must also have a knowledge of nutrition, genetics, and management.

Advantages and Disadvantages--The technician can expect excellent opportunities in the future, especially if he keeps abreast of the innovations that will occur in artificial insemination.

The increased use of this method for reproducing animals may result in fewer purchases of male animals. On the other hand, the demand for offspring of superior transmitting ability is greatly increased.

Business and Office

Business and office occupations are of vital importance to the nation's businesses. Business workers play a major role in businesses and a wide variety of other organizations, both private and governmental. Whether the organizations are large or small, employing only a few people or many thousands, the effective business performance contributes greatly to the success or failure of the enterprise.

ACCOUNTANT

The major fields of employment are found in public, private, and government accounting.

Public accountants work independently on a fee basis for any business or individual wishing to make use of their services.

Private accountants, sometimes called industrial or management accountants, handle financial records of the firm of which they are salaried employees.

Government accountants work on the financial records of government agencies or, when necessary, audit the records of private companies.

History and Future--Modern accounting began with the technique of double-entry bookkeeping which was developed in the 15th and 16th centuries. With the Industrial Revolution, business became more complex and the need for accounting methods grew. With the development of governmental and industrial institutions in the 19th and 20th centuries it became necessary to have accurate records for periodic reports.

It is expected that employment opportunities for accountants will be very good in the near future. The demand for college trained accountants will be greater than for those without college training. Accounting employment during the next ten to twenty years should expand rapidly due to the complex and changing systems of taxation.

The increased use of new types of record-keeping systems and of computers will create a demand for well-trained accountants to serve as consultants to managers of various business and industrial organizations.

Work Environment--Accountants ordinarily work between thirty-five and forty hours a week.

Public accountants are subject to considerable pressure during the busy tax periods from November to April. They may find it necessary to work long hours and more than five days a week. Private and governmental accountants are also sometimes involved in much travel.

Training and Education--High school students preparing for an accounting career should be proficient in arithmetical and numerical concepts, speaking, and writing.

A bachelor's degree with a major in accounting is generally recommended for entrance into the accounting field.

Qualifications--The accountant is accurate with figures and has the ability to think logically. He has clarity of both oral and written expression, neat and orderly habits of work, sound judgment, and the ability to make his own decisions based on such judgments.

Advantages and Disadvantages--Advancement may be rapid for able accountants, especially in public accounting. Those with inadequate academic preparation are often assigned to routine jobs and find themselves handicapped in obtaining promotions.

CERTIFIED PUBLIC ACCOUNTANT

The certified public accountant is an internal auditor who specializes in analyzing, investigating, and measuring every operation of the company and its relation to the company's profit and loss. He probes into the workings of the organization, becomes familiar with the functions of every department, and ascertains that each job is being done as efficiently as possible. He seeks ways to raise costs and raise profits through better controls either by better accounting methods or by a change in procedure.

History and Future--The employment outlook for accountants is expected to remain excellent. This is especially true for college-trained and certified public accountants. Women certified public accountants should have no trouble finding rewarding work.

Work Environment--Working hours range from thirty-five to forty hours a week for the certified public accountant. Some overtime work is usual during busy seasons, depending on the nature of the company. The end of the fiscal year, when books are closed and reports are made, may be a busy time for the certified public accountant.

Training and Education--The certified public accountant must pass a special qualifying examination and hold a certificate issued by the state in which he wishes to practice. More than half of the states require certification or registration to practice as a public accountant, and the requirements vary considerably in each state.

Qualifications--The certified public accountant should like mathematics and be accurate and methodical in his work. Above-average intelligence and reliability are assets in this profession.

Advantages and Disadvantages--Certified public accountants can go into business for themselves if they are competent and hard working. They usually find their work challenging and interesting because of the variety of problems that must be solved.

The certified public accountant has to work overtime and travel is necessary.

MATHEMATICIAN

There are two broad areas in mathematics, theoretical and applied.

The theoretical mathematician is concerned with the advancement of mathematical knowledge, the logical development of mathematical systems, and the study and analysis of relationships among mathematical forms. They focus their efforts mainly on problems dealing with the investigative and developmental aspects of principles of mathematics and mathematical reasoning.

The applied mathematicians are concerned with the development and application of mathematical knowledge to practical and research problems in the social, physical, life, and earth sciences. Applied mathematicians work on problems ranging from stability of rockets to effects of new drugs on disease.

History and Future--There is a shortage of well qualified mathematicians and the employment outlook at all levels of preparation is expected to be good. It is anticipated that the demand for mathematicians with Ph.D. degrees will continue in both theoretical and applied areas of concentration, with many opportunities in the areas of research and instruction. Women mathematicians who are qualified for research or teaching should have good employment opportunities.

Work Environment--The mathematician usually has regular hours and works a forty hour week. The work is not considered hazardous but may require long periods of close concentration and eye or nerve strain. Professional mathematicians who work with or near electronic computing equipment will probably work in air-conditioned buildings since these machines are extremely sensitive to temperature changes.

Training and Education--The basic educational requirement for the mathematician is a bachelor's degree in mathematics.

The high school student who is interested in mathematics may wish to accelerate his studies by enrolling in summer session programs offering regular or elective mathematics courses.

Qualifications--The mathematician must have high intellectual curiosity and good imagination.

Advantages and Disadvantages--Mathematicians in positions with the federal government receive annual vacation leave, holiday vacations, retirement, medical plans, and other attractive benefits which make these job opportunities competitive with other work situations.

Institutions for higher education employ mathematical instructors for the academic year from September to June. The instructors can supplement their regular teaching income with summer school teaching, writing, and any available consultative opportunities.

SYSTEMS ANALYST

Systems analysts are instrumental in the business shift from manual to mechanical methods of doing accounting, payroll, and the like.

The analysts determine the exact nature of the data processing problem and then structure the answer so that the results can be gained more efficiently by a computer. Systems analysts prepare charts, tables, and diagrams to describe the flow. This may involve various techniques, such as cost accounting, sampling, and mathematical methods.

After the system has been devised, systems analysts often recommend the type of equipment to be used and prepare instructions for the programmer.

History and Future--The demand for systems analysts will continue due to rapid expansion of electronic data processing in business and government and the increasing sophistication and complexity of computers.

Work Environment--Systems analysts work a forty hour week. An occasional or rush project may call for their presence weekends or evenings. The work surroundings are quiet, clean, and well maintained. They are bothered by little more than the clutter of paper work.

Training and Education--Some employers request that candidates have a bachelor's degree and experience in mathematics, science, engineering, accounting, or business.

Some employers prefer to hire people as systems analysts who have had some experience in computer programming.

Qualifications--The analyst must have enough interest in his work to be willing to answer calls on weekends or evenings during a rush project.

Advantages and Disadvantages--Top management often considers systems analysts as saviors of a troubled business and expects too much of them and their electronic "brains." However, for the systems analyst who can significantly improve aspects of his employer's operations, the rewards are great, both in position and sense of accomplishment.

DATA PROCESSING MACHINE OPERATOR

Data machine operators are divided into two categories: computer operators and auxiliary machine operators. Computer operators communicate with the computer through a console, a part of the computer that is similar to a typewriter keyboard, used for entering and receiving commands and messages. The console message may ask the operator for another job or tell him that a prior inputted job has been completed.

The auxiliary operators are responsible for the input and output operations of the system when each operation is handled by a machine that is not controlled by the central processing unit. Input machines are used to prepare data that goes into the main computer unit, and output machines translate the information into usable form.

History and Future--The field of electronic data processing has experienced rapid growth for a number of years. At present many data processing specialists are needed to fill new positions. Although it may be easier for people to find jobs in data processing than in many other fields, growth will be moderate in the future. There will be more emphasis on the qualification of the applicant, and competition for available positions will increase.

Work Environment--Machine operators usually work forty hours a week. There may be opportunities for overtime at a pay rate of time and a half or double time. Small data processing installations usually operate on a single-shift basis, but larger installations often operate continuously, with three eight-hour shifts. Workers may always operate on the same shift or they may be given alternating day, night, and swing-shift assignments.

Computer operators usually have comfortable working conditions. The computers must be housed in specially constructed rooms that are cool and dust-free. Computer operators may find the short bursts of activity and constant machine noise annoying. There are times, however, when a computer will function for long periods without the close supervision of the operator.

Training and Education--A high school education is the minimum requirement for employment in electronic data processing. Many employers require from several months to two years of technical school training for computer operators; some firms prefer college training for their operators. Applicants for this type of work who have a good high school record need not hesitate, however, if their grades and aptitude tests show clerical and mathematical ability and an interest in bookkeeping, business machine operation, and business practices.

Qualifications--The data processing machine operator must like to work with machines and be capable of handling a variety of tasks on several types of equipment, always following specific instructions carefully. Good motor coordination is important because the machine operator must set up the computers quickly and respond to messages rapidly, especially when errors occur in the program.

Advantages and Disadvantages--There are several grades of operators: junior, senior, lead, and manager. From manager the operator can advance to programmer or supervisor of the system. Further advancement is open to persons who are interested and have had some years of experience and further education.

KEYPUNCH OPERATOR

The keypunch operator's work can usually be divided into two major tasks: selecting data to be punched from written information and recording information on a card by pressing the appropriate keys on the machine.

The operator places a stack of blank punch cards in the hopper at the top of the machine. She presses the keys to record the pertinent data from the order onto the punch cards.

Before the punch cards are fed into the computer, they are verified or checked for accuracy. This is done on a separate machine, a card verifier, which is similar to a keypunch. The operators feed the punched cards into a verifier and rekey the same material from the original documents. The verifier checks to make sure that the proper holes have been punched in the card. If a difference is sensed between what the verifier operator punches and the holes on the card, the machine will flash a red light and notch the card above the column in which the discrepancy occurred. If an error is found, a new card must be keypunched.

When the operator has finished recording all the necessary data and the cards have been verified, they are ready to be fed into the computer.

History and Future--Keypunch machines were first used in the United States by the Bureau of the Census in 1890 as an aid in compiling population data.

At first, businesses utilized the cards only to compile statistics. Later, as alphabetic keypunch machines and electronic computers were developed, private enterprise began to use the punch card system.

The trend toward increased use of electronic data processing methods is expected to continue.

Work Environment--Keypunch operators generally work a forty hour week, although overtime may be necessary during busy periods. Large manufacturing plants and other businesses that handle extensive volumes of paperwork sometimes hire keypunch operators for night-shift work.

Training and Education--A commercial high school program with courses in business machine operation, typing, accounting, and office procedures is good preparation for work as a keypunch operator. Students who attend commercial or vocational high schools may be able to include keypunch operating courses in their studies.

Some companies hiring large numbers of keypunch trainees conduct their own training classes. Others send the trainees to classes conducted by manufacturers of keypunch equipment. Some of these courses last from twenty to eighty hours depending on the company and the school.

Qualifications--Accuracy is important in keypunch work. The operator should have good eyesight (corrected with glasses if necessary) and strong powers of concentration. Patience is also important, as the work tends to be very repetitive.

Advantages and Disadvantages--Technology is rapidly expanding the need for computers and simplifying the jobs connected with data processing. Keypunch operators who are already working will be required to keep up with technological advancement if they intend to keep their versatility in the job market.

Advancement tends to be slow. The work can be monotonous, and to some people the noise of the keypunch machine can be disturbing.

COURT REPORTER

The court reporter is a very busy person during a court trial, sitting at a table near the witness, taking down every word by hand or on a shorthand machine. During the trial the court reporter records the questions asked of the witnesses, their answers, the arguments and comments of the lawyers, and the judge's rulings and instructions to the jury.

Many court reporters take notes on a stenotype rather than by hand. With each stroke a reporter can write a syllable, word, or phrase. The notes come out in English letters on a pad of paper.

At any time during a trial, the reporter may be asked to read aloud from his shorthand notes. This means he must keep his notes well organized so that he can find his place quickly without fumbling.

In a large city, a reporter usually covers the same court regularly. In less populated areas where one circuit judge serves several courts in different districts or counties, the reporter travels the circuit along with the judge.

History and Future--There is a shortage of qualified court reporters and an increasing demand for them. Business and other school placement services can usually place graduates as soon as they finish their training.

The employment outlook for court reporters is excellent and should continue so.

Work Environment--The court reporter's hours may be irregular. Some days the reporter may not have an assignment, and other days he may put in many hours of overtime. The irregularity of such work often requires personal sacrifice.

Training and Education--Many schools offer specific courses in shorthand reporting. They require a high school diploma or its equivalent for admission.

College training is not a requirement for the shorthand reporter, but it can be a help. An academic background and study of many different subjects are invaluable aids in improving one's vocabulary. Familiarity with words is a basic tool of the court reporter.

Qualifications--A patient, cheerful, and even disposition is helpful in reporting because the constant rapid writing sometimes becomes monotonous and demanding. A courteous manner, neat appearance, and well organized work habits are essential, as are good hearing and good vision.

Advantages and Disadvantages--Because of the need for well-trained reporters, a good reporter can choose the type of work and the part of the country he would like to work in.

Some people find the heavy pressure of constant writing monotonous and tedious. Recording every word that is said often imposes a heavy strain on the writer, both emotionally and physically.

LEGAL SECRETARY

The legal secretary is able to assist the lawyer or judge in the preparation of a wide variety of legal documents, including petitions, subpoenas, briefs, wills, contracts, and deeds. She often witnesses the signing of documents and is capable of doing supportive legal research. She is familiar with court procedures and should have a complete understanding of a law library so that she may use it with ease. Many legal secretaries have become notary publics.

History and Future--The demand is great for well trained highly competent legal secretaries, and the future looks even brighter. As the number of lawyers increases, so does the need for legal secretaries to assist them. The current expansion of legal services for the disadvantaged means there will be a demand for secretaries during the next few years.

Work Environment--A legal secretary may work for a lawyer in private practice or for several lawyers in a large firm. She may work for a legal department of a corporation, a judge, a legal aid center or governmental agency, an insurance company, a trust officer in a bank, or a deed and title company.

Training and Education--The legal secretary needs concentrated training in courses such as typing and shorthand, as well as many courses dealing with specific areas of the legal world.

The best road to success as a legal secretary is more education such as can be obtained by enrolling in a good private business school or junior college of business.

Qualifications--A legal secretary is well organized and efficient. She speaks tactfully to clients and is competent in arranging appointments. She is polite and poised at all times, able to handle any situation diplomatically and confidently. She knows and conscientiously practices the Code of Legal Ethics. Her telephone manners and personal grooming are always perfect. She is courteous, thoughtful, and highly ethical in every respect.

Advantages and Disadvantages--A career as a legal secretary can be meaningful and rewarding for persons who want to serve in the legal system of our nation. Starting salaries are excellent for the legal secretary.

MEDICAL SECRETARY

The medical secretary specializes in working for a physician, a dentist, a medical researcher, a hospital executive, clinic staff members, and the like. Sometimes this job amounts to being a medical assistant, as the secretary does routine medical tasks in addition to secretarial duties.

History and Future--Openings for medical secretaries will continue to grow during the next decade. Many will be hired to fill new jobs, but an even greater number will be needed to replace those who retire or stop working for other reasons.

Work Environment--Most medical secretaries work in clean, well-equipped, air-conditioned offices. Although situations vary, most work about eight hours a day five days a week. If extra hours of work are required to finish a job, overtime pay or additional time off is usually given.

Training and Education--A high school diploma is a minimum requirement. Most high schools offer business courses, sometimes along with on-the-job training. Vocational schools offer more extensive business training than does the average high school.

Qualifications--The prospective secretary should have a thorough knowledge of English and the ability to read rapidly and accurately and to organize work. Spelling, punctuation, and grammar skills are essential. The ability to work under pressure and to function as a member of a team are important. A pleasant phone voice is also helpful.

Advantages and Disadvantages--Most secretaries receive fringe benefits such as paid vacations, hospitalization, insurance, retirement plans, and sick pay. As with salaries, benefits vary according to the individual situation.

EXECUTIVE

An executive's basic job is to get things done by directing and coordinating the efforts of other people. He may be responsible for making policy, planning, organizing, or controlling. He may have thousands of people working under him or none.

All executives, regardless of where or at what level of management they work, have two qualities in common: leadership and a sense of responsibility.

Top management usually consists of executives, such as the president, the members of the board of directors, and other company officers, who take part in deciding company policy. Middle management includes executives and junior executives who are responsible for seeing that company policy is carried out.

History and Future--The opportunities for management executives should increase at a moderate pace during the coming years. The problems of automation, computerization, and expansion require a larger ratio of competent administrators to solve them and guide production at a smooth pace. The executive of tomorrow will need more background in science, mathematics, and computers to deal effectively with these situations. Rising living standards and an increasing demand for services will also contribute to the need for qualified people.

Work Environment--Some executives work normal hours; most work long and irregular hours. Constant pressure and the demand for creative thinking are factors that frequently require the executive to put work ahead of personal life. An understanding family and patient friends are great assets.

Training and Education--A college degree is necessary to become an executive. There are three kinds of curriculum that may lead to an executive's position: a specialized major such as science or engineering, an industrial management course, or a liberal arts course.

Qualifications--There are certain qualities all executives should posses: an ability to get along well with others, sound judgment, self-confidence, and emotional maturity. He should have good health, imagination, and creativity.

Advantages and Disadvantages--The salary range of executives varies widely depending on the size of the company and the responsibility of the position.

Benefits often include stock options, profit-sharing plans, and bonuses. The usual vacation and insurance benefits are also included in the employment program of most companies.

BANK EXECUTIVE

Bank executives are the men and women who operate the bank according to the policies laid down by the board of directors. In the day-to-day business of the bank, they make decisions and supervise other personnel in the performance of their work. The scope of their responsibilities depends on the size of the bank. In small banks one officer may do several jobs. In large banks, functions may be separated into many departments.

In any bank, the president is usually the top officer and is responsible for all operations. In huge financial organizations the position of president carries tremendous prestige and weighty responsibility. He is directly answerable to the board of directors for the execution of their policies and the operations of the bank.

History and Future--The banking world expects the number of executives to increase rapidly. About 10,000 executive replacements are made annually.

Work Environment--Bank executives usually work in clean, well-lighted office buildings with private offices and secretaries.

Bank executives work a 37 1/2 hour week, but often their considerable responsibility requires them to put in a good many extra hours of unpaid work.

Training and Education--High school students who aspire to bank administration should follow a college-preparatory course. Emphasis should be on mathematics, grammar, and composition and should be balanced, where possible, with typing, bookkeeping, and public speaking.

Qualifications--As a representative of the local business community, the bank executive will be expected to participate in many civic activities. Therefore, initiative, leadership, sober judgment, warmth of personality, good grades, and student group participation are qualities bank recruiters seek.

Advantages and Disadvantages--Banks offer well-above-average fringe benefits, such as paid vacations and holidays, comprehensive insurance programs, pension plans, and profit sharing arrangements.

INDUSTRIAL TRAFFIC MANAGER

The traffic manager is in charge of the activities of shipping and receiving personnel. He is responsible for the distribution of goods within his own company as well as for outgoing goods.

He must determine which is the most economical and quickest means of shipping goods: water, rail, pipeline, or highway. When goods are delayed en route to a destination, industrial traffic managers must determine why the delay occurred. Then they make arrangements with owners of transportation companies to speed up transportation.

In most companies, the traffic manager is responsible for the personnel of his department. Payroll and other related problems may be directed to him for solutions.

In a small firm, the traffic manager may have to produce claims, approve routine bills, trace lost shipments, lease parts and terminal facilities, or clear goods through customs.

History and Future--Since World War II, traffic management has become a well developed area of work.

As the population of the United States grows larger and more mobile and the movement of their belongings becomes necessary, the need for traffic managers and traffic management personnel increases.

The employment outlook for industrial traffic managers is good.

Work Environment--The industrial traffic manager works thirty-five to forty hours per week. He may be required to work extra hours preparing reports and attending meetings.

Training and Education--To obtain a job in industrial traffic management, one must have graduated from high school or have equivalent education. The subjects with the greatest value are English, mathematics, chemistry, physics, geography, bookkeeping, typing, and business practice.

Qualifications--Basic leadership qualities such as enthusiasm, initiative, tact, honesty, and thoroughness are essential. The traffic manager must also be able to accept responsibility and give orders effectively. He should be at ease when meeting and talking with people.

Advantages and Disadvantages--Beginners and lower positions in traffic departments may be engaged in a routine of repetitious detail. Conditions may be moderately dirty, noisy, and uncomfortable, depending on the particular job and place of employment.

The man or lady on the way up may have to give extra hours to learn all phases of the traffic manager's position. Experience and demonstrated ability are considered to be the most important factors in promotion to the higher level jobs.

BANK TELLER

Bank tellers may perform a variety of related duties in their jobs. Those known as "paying and receiving tellers" are primarily responsible for serving the public directly by accepting customers' deposits and providing them with receipts, paying out withdrawls, recording the transactions, cashing checks, exchanging money for customers to provide them with certain kinds of change or currency, and accepting savings account deposits.

History and Future--In ancient times men would sit at low benches or tables to transact financial business and to exchange money with customers. Today, the work of the teller is quite similar to that performed in ancient times.

The word bank has come to us from Italian "banco" meaning "bench."

The employment outlook for bank tellers is predicted to be good for the forseeable future with the numbers of tellers needed increasing rather rapidly and continuing for some time.

Work Environment--The majority of bank employees work a forty hour week. Tellers may sometimes be required to work rather irregular hours and overtime may be necessary perhaps once a week.

Working areas are usually favorable in pleasant and attractive physical surroundings. Office equipment and furnishings in many banks today are very modern and endeavors are made to create a relaxed but efficient work atmosphere.

Training and Education--The majority of banks and financial institutions require that applicants have at least the minimum of a high school education. Many bank employees today have a college education or they have taken specialized training courses offered by the banking industry.

Qualifications--The bank teller must have accuracy, speed, a good memory, the ability to work with figures, manual dexterity so that money may be handled quickly, and neatness and orderliness in the performance of work. A bank teller's honesty must be above reproach, reflecting absolute trustworthiness.

Advantages and Disadvantages--Bank tellers may enjoy the satisfaction of job stability and security offered in banking work. Bank tellers also enjoy membership in an occupational group that carries community respect and social acceptance.

Those persons who find it an emotional strain to handle and be responsible for large sums of money may find the job not appealing to them. The teller must also sometimes work under the pressure of busy rush hours.

FINANCIAL ECONOMIST

The financial economist studies the nature and relationships between the quantity of money, credit, and purchase power in order to develop monetary policies and to forecast financial activity. He investigates credit structures and collection methods in order to improve them. He examines banking methods and procedures to devise techniques for regulation of lending and fixing interest and discount rates, and he may recommend or establish domestic and international monetary policies.

History and Future--The need for economists specializing in business is primarily a development of the 20th century.

Industries will employ many economists, as businessmen become more accustomed to relying on scientific methods of analyzing business trends, forecasting sales, and planning purchase and production operations.

Work Environment--The financial economist generally has pleasant working conditions.

The average workweek is forty hours, particularly for those employed in business positions.

Training and Education--A bachelor's degree with a major in economics is considered the minimum preparation for a beginning or entry job as an economist.

Those who plan to become financial economists should pursue additional graduate study beyond the bachelor's degree.

Qualifications--Personal attributes which are desirable for the financial economist are dependability, accuracy, patience, and objectiveness. An economist must be able to analyze and interpret data, reason abstractly, solve problems, and express ideas orally and in writing.

Advantages and Disadvantages--Many positions in economics are not considered high salaried; most of the jobs pay sufficiently well to provide for individual and family security. Opportunities are available for those whose drive and needs are such that they must forge ahead to high paying and more responsible positions.

CASHIER

The main function of the cashier is to receive payment from customers for purchases or services rendered to him by his employer. He performs this task in a variety of locations. Cashiers work in theater box offices, amusement parks, gas or electric utility companies, department, grocery, or other retail stores, hotels, and hospitals.

The cashier receives the customer's money, makes the proper change, and gives the customer a receipt. He usually uses a cash register or an adding machine or a combination of the two. He may sell candy, cigarettes, baked goods, or novelty items which are in a counter near him. In a theater box office, he also operates a ticket dispensing machine.

History and Future--As businesses expanded and supermarkets and self service stores came into common usage, more and more businesses employed cashiers to receive customers' money, make change, provide customer receipts, and often to wrap the merchandise purchased.

Future job opportunities will probably be more available to those individuals who have obtained specialized training in bookkeeping, typing, business machine operations, and general office skills. Many job opportunities should also be available to those who wish part-time employment.

Work Environment--Cashiers are usually employed on a five day, forty hour week in retail businesses and supermarkets.

Working areas are usually pleasant and many times in attractively decorated surroundings. Sometimes the work area may be small and confining since many cashiers work behind counters, in cages, booths, or in other small places.

Training and Education--Most employers require that potential employees be a minimum of eighteen years of age and a high school graduate.

High school students may find that courses in bookkeeping, typing, business machine operations, business arithmetic, and related areas are assets in developing skills for a career in cashiering.

Qualifications--Personal appearance and attitude are very important in the cashier's work. A pleasant and congenial disposition and a desire to serve the public are needed. Tact and diplomacy, accompanied by a smile, are real personal assets.

Advantages and Disadvantages--Cashiering is usually not a difficult job for which to qualify. It requires no prolonged training period nor are the personal requirements extremely rigid. It is normally a pleasant job in which one meets all kinds of people.

Although the cashier is subject to rush periods and customers' complaints, pay is not too high and the cashier is responsible for the cash on hand balancing with total receipts. Some jobs require the cashier to personally make up any shortage.

RECEPTIONIST

The receptionist's duties vary with the type and size of the firm that employs her. In some offices she may be in charge of the switchboard and be expected to do filing, typing, and bookkeeping.

In a manufacturer's showroom the receptionist may demonstrate display models of the company's product or arrange tours through the plant.

In a doctor's or dentist's office the receptionist's most important duty is to keep appointments straight. She usually answers the telephone, sends out bills, and keeps the waiting room in order.

In general, the receptionist's main duty is to greet people; she acts as a kind of hostess for her company.

History and Future--In ancient times, businessmen employed persons to greet callers and set up business appointments. They were not receptionists but secretaries who lived in the household and performed many business-related functions. As each succeeding century brought increasing technological advancement, business activities became more and more complex, and eventually the task of greeting callers became an occupation.

More and more business firms are recognizing the importance of the receptionist in promoting good public relations. Since personal appearance and personality are so important in this job, it is unlikely to be affected by automation.

Work Environment--Receptionists in large business firms work in pleasant, well furnished front offices or waiting rooms, free from noise and overcrowding. Some businesses have no room for a separate reception area, and the receptionist may have to do her greeting and telephone answering in the midst of a busy office.

The receptionist's hours are usually eight hours a day, five days a week. However, in a doctor's office, a hospital, or a beauty shop, she may have to work some evenings or weekends as part of her regular hours.

Training and Education--A high school education is required. Courses in English, spelling, typewriting, bookkeeping, and business practices are assets for a beginner.

Receptionists in a physician's or dentist's office may need some special training in such areas as recognizing emergency situations and the scheduling of appointments for various procedures.

Qualifications--The receptionist must be able to get along well with a variety of people, those within the company as well as visitors. She should cultivate a well modulated voice and learn to speak clearly and distinctly, especially if she will be expected to answer the telephone.

The receptionist may also encounter people who ask questions she is not supposed to answer. Avoiding revealing confidential information while maintaining the customer's goodwill may require a good deal of tact and imagination.

Advantages and Disadvantages--Advancement depends on the employer as well as the employee. Some companies have little opportunities for advancement. In other companies a receptionist who shows ability and who is willing to obtain further training may move into higher paying sales, clerical, or secretarial jobs.

The receptionist who takes pride in her job has the satisfaction of knowing she is instilling a favorable image of her employer in the minds of those she meets. Her cheerful, courteous greeting may be the only bright spot in the day of a hurried visitor.

FILE CLERK

File clerks work in all types of business offices. They may work in general offices or for departments of large companies (for instance, the sales department).

The file clerk files letters, orders, invoices, receipts, and other business records in file cabinets or drawers. She places the materials in files following the directions of her supervisor. She may file the items by subject matter, number, alphabetically by names of individuals or companies, or by a special system used by the office. The file clerk also prepares file folders and labels when needed. She may need to sort the materials before they are filed or another office worker may do this. In some offices, she prepares indexes to items on file.

When asked, the file clerk finds materials in the files and gives them to the person requesting them. She may keep a record of who has the items and the dates they were taken and returned. She may also clean out-dated materials from the files.

Some file clerks are required to type and to open and deliver mail when not doing filing work. Some also act as receptionists and answer telephones. Still others are assigned to different jobs from time to time. They sometimes handle unusual or special assignments in addition to their regular filing duties.

History and Future--Job opportunities in clerical work should be good, especially with large companies. Those clerks with typing ability are usually in greater demand.

Clerking is a beginning job in many offices and a first job for many office workers. Several openings occur each year to replace workers who leave for other kinds of work.

Work Environment--Most file clerks work in modern, well-lighted, air-conditioned offices. They may stand for long periods of time while filing materials. There is much reaching, walking, bending, and stooping involved in this work.

Because the same operations are repeated over and over again in this work, the applicant should not mind routine work.

Training and Education--High school graduation is required by many firms hiring file clerks. During high school, courses in typing could be helpful for students interested in becoming file clerks.

Qualifications--File clerks must have a good memory and the ability to work rapidly and accurately. The ability to read well and to learn different filing systems is very important. The file clerk must also be neat and orderly in her work.

Advantages and Disadvantages--The work is in pleasant and congenial surroundings, but one should realize that the work performed is often repetitious and the duties are very similar from day to day.

TYPIST

The occupation of typist can be considered in three main categories: general typist, transcription typist, and specialty typist.

The general typist copies letters, manuscripts, and reports. In addition, she may handle routine billing procedures and prepare stencils or other duplicating masters.

The main duty of the transcription typist is to prepare typewritten copies of material that has been recorded on a dictating machine.

The specialty typist uses a specially equipped electric machine from which she can transfer coded messages to magnetic or paper tapes for use in a computer. She might also operate a computing or a noncomputing billing machine, a teletypewriter that sends and receives long-distance messages, or a varityper on which she can remove one typeface and insert another (roman, gothic, or italic).

History and Future--The problem for the qualified beginner is not finding a job but choosing a good one. Most sections of the country report job openings for typists on every employment survey. The majority of these come as replacements for young women who stop work to take care of their families. Turnover among typists has been and undoubtedly always will be high for this reason.

As automation continues and new machines are introduced, it will become even more necessary for a typist to increase her skills so that she will be qualified to use the new equipment and thus reach a more skilled position and a higher salary. When the opportunity is available for learning about new methods of business, she should take full advantage of it.

Work Environment--Office workers in private industry generally work thirty-five to forty hours in a five day week and are usually paid for six or seven holidays and two weeks of vacation annually. Many establishments also provide health and life insurance, retirement benefits, sports, social programs, and profit-sharing or yearly bonus plans.

Training and Education--Graduation from high school is a minimum requirement for almost every office job. A business training curriculum in high school will include one or two years of typing, enough to pass standard speed tests of fifty words a minute with ease. Business English, office practice, bookkeeping, shorthand, and other business courses offered will be assets, particularly for promotion. Besides typing skills, a good typist must have a knowledge of business practices and of spelling, vocabularly, punctuation, and grammar.

Qualifications--The good typist, like most other people successful in business, will strive to get along with her co-workers. A pleasant personality, thoughtfulness, discretion, and courtesy will all help her to attain this goal. A person who has continually tried to increase her knowledge of various subjects, better her secretarial skills, use initiative, show loyalty, and respect confidential information will usually merit advancement in any organization.

Advantages and Disadvantages--The job of typist provides entry into an office, and advancement is often possible, even for those not previously trained in secretarial skills. The door is sometimes opened to other opportunities through company-sponsored education programs conducted at the place of employment or at established schools in the community. Typists who qualify can progress to the position of stenographer or secretary, correspondent or clerical supervisor, office manager or administrative assistant, or head of the typing pool or some other company department.

MAIL ROUTER

The mail routers deliver and collect mail in an assigned area, which may include one large building with many offices or an outlying area.

Most of the router's time is spent indoors, where he or she comes into close contact with people.

The router's first task is sorting the mail. The mail must be sorted carefully, according to prearranged stops. The mail is delivered throughout the building. The router makes stops to each office leaving the mail with the secretary and picking up mail to be delivered to the main office.

History and Future--Benjamin Franklin was responsible for setting up the first mail delivery system in the United States.

Most of the jobs for office mail routers today are found in large urban areas such as New York City, Chicago, Boston, Los Angeles, and Philadelphia.

Although a majority of the jobs are in metropolitan areas, there are many jobs in smaller communities.

Work Environment--Most routers work a five day, forty hour week. Their work is mostly done indoors with people.

Training and Education--The applicant must be eighteen years old. He must know simple arithmetic, spelling, and be able to follow instructions.

Qualifications--The mail router must have a good memory, legible handwriting, good eyesight, and must be a person of honesty and integrity.

Advantages and Disadvantages--In addition to regular salary, routers receive generous fringe benefits, including a paid vacation, paid sick leave, and insurance benefits.

Routers must be able to stand for long periods of time and walk long distances.

XEROX MACHINE OPERATOR

The xerox machine can be operated by almost any office employee. The more complicated machines are capable of producing thousands of copies of typewritten and handwritten documents in a single "run" and are usually operated by trained operators who spend most of their time doing this type of work. The operators who use these machines insert in the machine a master copy of the document to be reproduced and then adjust the mechanism and start the machine.

History and Future--Job openings for xerox machine operators are expected to occur each year through the 1970's. Most of these openings will arise as business organizations continue to grow in size and number.

Work Environment--The conditions for xerox machine operators usually are similar to those of other office workers.

Training and Education--Graduation from high school or business school is the minimum educational requirement.

Qualifications--Good coordination of eye and hand movements and good vision are important for most machine operators.

Advantages and Disadvantages--Promotions occur frequently. Many xerox machine operators often advance to more complex positions, and employers usually provide the additional training required for advanced positions.

Communications and Media

As man becomes more sophisticated, so do his communication devices. This can be witnessed by such inventions as the printing press, the telegraph, and the telephone. The advent of radio and television ushered in a communication explosion which is progressively mushrooming as more advances in technology are made. Many new jobs have resulted from such an explosion, and an expansion of new jobs is expected to continue.

FREE-LANCE WRITER

Free-lance writers can be found among housewives, teachers, merchants, mechanics, stenographers, nurses, and others in almost every city and town in the country. Since they are in business for themselves, they work in their own homes or offices. In the course of a year the free-lance writer may submit dozens or even hundreds of manuscripts to editors or publishers in scores of cities.

There are two classes of free-lance writers. There are those who will write anything, either on their own initiative or by assignment.

The other group of free-lance writers are the specialists. They confine themselves strictly to one field or even one aspect of a field.

The free-lance writer's work consists of research, reading, writing, revising, and intelligent marketing.

When the writer has done the preliminary research and reading, he begins the actual production of the article. The writer must cover as much ground as possible in as few words as possible. This involves repeated writing and revising.

History and Future--The future for a free-lance writer depends upon the free-lancer himself. The writer with ideas and a talent for communicating them with meaning and interest will always have a market for his material.

Work Environment--The conditions are generally pleasant. He does his work in the peace and quiet of his home or in libraries, museums, court houses, newspaper offices, factories, or wherever the quest for information takes him.

The free-lance writer sets his own hours. He may work only when the spirit moves him, or he may put in a regulation day.

Training and Education--A college education is important but not necessary for free-lance writing. Some have learned the rudiments of writing by taking correspondence courses or simply by reading.

College education is recommended for the free-lancer who aspires to an editorial position with a newspaper or a magazine. He would major, of course, in such subjects as English, literature, drama, or journalism. He should learn as much as he can about other fields, such as history, political science, religion, and science.

Qualifications--Free-lance writers should have writing ability, aggressiveness, and the kind of self-confidence that can sustain constant rejection by editors.

Advantages and Disadvantages--The free-lance writer must contend with rejection. The writer may work for weeks and months on an unassigned article only to have it returned with or without comments by the editor. Rejections happen in the lines of the best free-lancers, and they happen often when the inexperienced or unpublished author is trying to establish himself.

After the free-lancer becomes well established, he will find editors and publishers calling upon him to do articles. When that time comes, the writer will know that he has "arrived."

COLUMN TYPIST

The column typist's main job assignment is to produce typed copies of printed and handwritten materials in column form; in this respect, his work is somewhat different from the office typist's. Some column typists may work from rough drafts which are difficult to read and which contain difficult material. They will also have to rearrange materials for column form, although some typists are provided with proportional spacing typewriters.

History and Future--The invention of the typewriter in 1829 by W. A. Burt eventually created the occupation of typist, as typewriters went on the market during the period 1847 to 1856. This important technological advancement increased communication.

As communication continues to expand more column typists will be needed on the news staff. The greatest demand will be for typists who can do other work at the newspaper.

Work Environment--The column typist works in offices for newspapers or magazines.

Training and Education--Employers generally prefer to hire a high school graduate. Most employers require an applicant to type with accuracy forty to fifty words per minute.

Qualifications--Important aptitudes and personality traits for this occupation include finger dexterity, accuracy, and the ability to concentrate. Column typists should also have good health for regular prompt job attendance and good eyesight.

Advantages and Disadvantages--The physical work surroundings are usually pleasant and comfortable in modern well-furnished and equipped offices. The work is not hazardous or physically strenuous, although the work must sometimes be performed under the stress of time and deadline pressures or other adverse circumstances.

PHOTOTYPESETTER

The phototype operator sends perforated paper tape or magnetic sound tape into a phototypesetting machine which "reads" the tapes and photographs the individual characters indicated on the tape.

Some typesetters operate photolettering machines which produce lines or individual characters in large-size type, such as those used for newspaper headlines and for advertisements. As in phototypesetting, a photographic process is involved, and the final product is on film or paper.

Typesetters frequently operate tape-performing machines called teletypesetters which have keyboards similar to those of typewriters. The machines are fitted with reels of tape that are perforated as the keys are struck. The perforated tapes are inserted in the linecasting machines, which set the type as directed by the perforation (to make a line of holes to facilitate separation). After the tape has been punched, it may be sent by teletype to other cities where it is automatically reperforated and used to control the operation of linecasting machines.

History and Future--The number of firms using typesetters range from fewer than 100 in 1964 to nearly 1,100 in 1969. Further increases are anticipated.

Technological changes will also significantly affect the educational and skill requirements for phototypesetters because greater use of phototypesetting will require some photographic skills.

Work Environment--Working conditions vary from plant to plant. In some plants heat and noise are factors. In general, the newer plants are well lighted and clean, and many are air conditioned.

Training and Education--An applicant must be a high school graduate. A good background in English, spelling, and mathematics is helpful.

Qualifications--An interest in electronics and photography is becoming increasingly useful. Artistic ability is an asset for a phototypesetter.

Advantages and Disadvantages--Phototypesetting operators have year-round employment and better than average earnings. Persons with certain physical disabilities, such as deafness or loss of one leg, can perform this work efficiently. Operators are employed in all sections of the country and in communities of all sizes.

The work may be monotonous to some. Operators may be required to work under pressure to meet deadlines.

CYLINDER PRESSMAN

The cylinder pressman's duties are similar to those of the letterpress operator, but some differences arise because of the specialized character of the press. A cylinder press has three cylinders. The first cylinder carries the metal plate. The second cylinder carries the rubber blanket, and the third cylinder carries the material on which the impression is to be made.

The cylinder pressman is responsible for the proper operation of the press. He makes all adjustments on the cylinder to make sure it is operating smoothly.

The cylinder presses are used for books, magazines, and pamphlets. They can handle large sheets of paper up to 72 inches wide.

History and Future--Printing in the United States began in Cambridge, Massachusetts in 1639. Since then Boston, New York, and Philadelphia have become the principal centers of printing in the country.

About 1814 Koenig, a German, developed the first practical cylinder press. This was later improved for use in printing newspapers.

Work Environment--The cylinder pressman works under almost ideal working conditions, as far as temperature and humidity are concerned. The pressman generally works in an air-conditioned shop or at least where the humidity is regulated for bodily comfort.

Depending on where the pressman works and the type of press he operates, he may have one or more helpers or he may work alone. In either case, he is generally in contact with other employees of the shop or with management personnel. His co-workers generally include cameramen, strippers, layout men, artists, and shop foremen or "owners."

Training and Education--A high school education is usually required to enter this occupation. An increased importance is being placed on having had specialized high school courses, such as art, print shop, mathematics, chemistry, and physics.

Qualifications--The cylinder pressman should have considerable mechanical aptitude, manual dexterity, and a genuine interest in printing. He must have good eyesight and especially good color perception, since he must mix inks and match colors. He should be alert and able to follow oral and written instructions.

Advantages and Disadvantages--The pay is above average for most pressmen. The printing industry has less seasonal fluctuations than most industries which means steady employment for its workers.

Pressmen must be on their feet and active during their working hours. They work with solvents, inks, and other solutions which produce unpleasant odors and may cause skin rash.

PRESSMAN

The pressman's work includes "making ready," which means that all the type or plates must be at exactly the same level. On an elaborate printing job, "make ready" work takes hours, and the pressman must start and stop the press many times as he adjusts the type or plates.

The pressman must watch the press constantly to be sure that it is operating properly. He must also check the printed material from time to time to see that the impression and color are correct.

History and Future--Many technological changes have taken place in the printing industry since the Chinese and the Koreans discovered they could reproduce images with carved wooden blocks. This method of printing was first used in the ninth century. In Germany about six hundred years later in 1454, Johann Gutenberg and others invented and developed movable type and methods of casting it in metal.

After the invention, printing spread rapidly throughout Europe.

Work Environment--The workweek for the pressman ranges from thirty-five to forty hours, with the average about 36 1/2 hours.

A two week vacation with pay after one year's employment, as a general practice, seems to be giving way to three weeks, especially in unionized plants. Even a fourth week is not unusual.

Pressmen face some problems of noise from the machinery. Many of the printing plants are air-conditioned, and most are well lighted and clean.

Training and Education--An applicant must have a high school education or its equivalent. Helpful high school courses include English, grammar, spelling, and mathematics.

Qualifications--Physical strength is important for many of the jobs in the pressroom. Pressmen often lift heavy press plates or page form, and they stand and stoop a lot. Reasonably good eyesight is important because the pressman must be able to mix colors for the color processes.

Advantages and Disadvantages--The pressman earns time and a half for overtime and double time for holidays.

Some older plants that are not air-conditioned are hot because of the heat created by some machines that use molten metal for casting type.

FILM EDITOR

The editor's job has come into being because of the way a film is made. Usually the film is a jumble of unrelated shots when it is first seen by the film editor. It is estimated that there is at least six times as much film as can be used in the final version. The editor's job is to select the scenes that will be used and to arrange them in an orderly pattern that will please an audience.

The film editor has to make many decisions. First, he must decide whether there is the proper film coverage to tell the story in the most effective way. He is concerned with the matter of timing the scenes to give the picture a pace that will hold the audience's interest. The editor also has to decide where to make cuts in the film and where special optical effects, such as dissolves or trick photography, are needed. He has to order these from specialists.

History and Future--The popularity of television films and the abundance of commercials, as well as the increase in the number of company units to produce training, sales, and promotion films, should provide adequate opportunities for qualified workers.

There are few women in this field, but opportunities are good for those who enter it.

Work Environment--The film editor is supposed to be limited to a forty hour workweek, but this hardly ever happens. It is not at all uncommon for him to work twelve hours a day or longer during the weeks before a film is completed. Television film editors work under great pressure, being frequently assigned to edit films only forty-eight hours before they are shown.

Training and Education--In high school, courses in English, art, and photography will be helpful. One should learn how to use a movie camera, how to make a sequence of shots that tells a story, and how to cut and splice to remove scenes that do not contribute to the total effect of the story.

Qualifications--The person who wants to be a film editor should be dedicated to his work and should be able to endure long hours and heavy pressure.

Advantages and Disadvantages--Film editing is an ideal job for the person who wants to combine technical work with an opportunity for creative artistry. Probably the greatest reward it offers is the fascination of the job itself.

Film editors in some fields have trouble keeping year-round employment.

CARTOONIST

Cartooning in the hands of real pros is an exceedingly sophisticated form of communication in terms of both art and content. Not very long ago, cartoonists were ranked fairly low on the artistic ladder. The only exceptions were the handful of great political cartoonists. All the others were looked down on as having little artistic talent.

Years ago, it was enough to think up a good gag and if the gag was funny enough, a clumsy or even a bad drawing was acceptable. However, today a good cartoonist, even a good average cartoonist, must draw well because cartoon audiences are a lot more sophisticated than they have ever been.

History and Future--Benjamin Franklin invented and drew the first newspaper cartoon. Comic strips were born in a New York newspaper circulation war of the 1890's as a way of holding readers. A strip called "The Yellow Kid" is considered the first genuine strip.

The family comics came along in the Roaring 20's. These include "The Gumps," "Blondie," "Gasoline Alley," and "Little Orphan Annie."

Employment outlook for the cartoonist is very good because there is scarcely a newspaper or magazine that does not use cartoons.

Work Environment--Cartoonists work for newspapers, magazines, and trade journals doing either the single-illustration cartoon and caption or the comic strip. They also work for manufacturers and television and movie producers.

Training and Education--A cartoonist needs a broad liberal education. This does not necessarily mean one must have a college degree, but it does imply that through either night school or extensive independent reading one acquires the equivalent knowledge and information.

Qualifications--A cartoonist must have the zeal and self-discipline to put in endless hours of study and practice.

Advantages and Disadvantages--With a combination of luck, exceptional talent, and creativity, one could equal the top cartoonist's earnings.

Some cartoonists get off to a slow start because cartooning is one of the most competitive fields.

PLAYWRIGHT

A playwright is a "maker" of plays; play writing is what he does.

He or she writes original plays about a series of events in real or imaginary life. The playwright differs from the novelist or short story writer in that he produces a story to be presented in a theater, on radio or television, or in motion pictures. The playwright creates an illusion of reality primarily through speech with a minimum of directions and descriptions of the action required by the performers. However, the playwright must be familiar with the mechanics or business of the medium for which he is writing (stage, television, radio, or the movie industry). He may indicate specific gestures and entrances to or exits from the stage at specific lines of dialogue. He may also suggest specific camera angles for a production of his play.

The playwright may adapt fiction, non-fiction, or historical events into a motion picture.

History and Future--Historically, the theater began as a religious ceremony. The early Greeks and probably other ancient people prepared pageant-like presentations for the festivals of various gods. Gradually, the pageants developed into something nearer to the plays and movies we have today.

There is always a demand for playwrights. However, the competition is keen. Beginners have opportunities to gain recognition in television as a prime point of beginning, but the motion picture industry, the legitimate theater, and radio stations all seek well-written and original stories.

Work Environment--The conditions under which playwrights work vary and are often created by the playwrights themselves. Beginners in the field frequently work at "bread and butter" jobs and write in their spare time. Others, who have become established in the profession may work in dens or studies in their homes or in small offices. Those beginning may live in cold water flats in low rent districts.

Some playwrights may work two or three hours a day and take a year to write a play; others may take a few weeks.

Training and Education--Today, college training is a requirement for a successful playwright. A thorough knowledge of English is important. A good background in social science, language, and typing is an asset.

Qualifications--The playwright must be creative and imaginative with a deep and thorough understanding of human nature. A high intelligence and considerable patience are also helpful qualifications.

Advantages and Disadvantages--Playwrights who have achieved notable success command larger incomes than beginners.

Some playwrights may work long irregular hours to meet a deadline and disappointments are numerous for would-be writers. Only the talented attain real success.

LINEMAN

In constructing new telephone lines, linemen place wires and cables leading from the central office to customers' premises. They use power-driven equipment to dig holes and set in telephone poles which support cables. Linemen climb the poles which support cables, usually leaving the ends free for cable splicers to connect later.

Linemen repair and maintain existing lines. When wires or cables break or a pole is knocked down, linemen make emergency repairs. The line crew foreman keeps in close contact with the testboard foreman who directs him to trouble locations on the lines. Some linemen periodically inspect sections of lines in rural areas and make minor repairs and line changes.

History and Future--Employment of linemen is expected to increase at a slow rate, despite anticipation of a continuing high level of activity in line installation. However, hundreds of job openings for these craftsmen are expected to become available during the next decade because of the need to replace workers who transfer to other jobs, retire, or die.

Work Environment--Linemen must do a considerable amount of climbing. They also work in manholes, often in stooped and cramped positions. Safety standards developed over the years by telephone companies, with the cooperation of labor unions, have greatly reduced the hazards of these occupations.

Training and Education--Applicants must have a high school or vocational school education. Knowledge of the basic principles of electricity, and especially electronics, is helpful.

Qualifications--Manual dexterity and the ability to distinguish colors also are important. Men who have received telephone training and experience in the armed services frequently are given preference for job openings and may be brought in above the entry level.

Advantages and Disadvantages--Linemen are covered by the same contract provisions governing overtime pay, vacation, holidays, length of service, and other benefits that apply to telephone workers.

When severe weather conditions damage telephone lines, linemen may be called upon to work long and irregular hours to repair damaged facilities and to restore service. Some linemen, by the time they reach their mid-fifties, transfer to other jobs, such as installers, repairmen, or central office craftsmen.

TELETYPE OPERATOR

The teletype operator sends and receives messages on high speed machines that look and operate very much like electric typewriters. The messages are sent and received entirely in capital letters. Teletype machines are electrically connected with other machines of the same kind at receiving and sending points.

Some teletype operators work on machines that perforate the message on paper tape. The tape is then put into another machine that sends the coded message to the receiving office where it is automatically translated and printed on sheets of paper.

The teletype operator may also perform duties such as typing and clerical work, especially in a private business office where operating the teletype machine is not a full-time job.

History and Future--Today's teletype operator has replaced yesterday's telegraph operator, and the teleprinter or teletypewriter has made the old dot-and-dash Morse code obsolete. The telegraph key and sounder are rarely used for transmitting messages.

New job opportunities are continually created by the expansion of business and industry. There are more jobs available because of the greatly increased use of teleprinter communications by business and government agencies. Large numbers of teletype operators are needed to handle this quick, economical method of communication.

The turnover among operators is high, so there are always job openings for both beginners and experienced teletypists.

Work Environment--The teletype operator normally spends eight hours a day on the job and works five days a week. Occasionally the teletypist works overtime daily or on weekends. He or she works in a large office that has many desks, teleprinter machines, and other communication devices.

Training and Education--Most employers prefer to hire people who are high school graduates. For beginners they select young people eighteen to twenty-five.

Teletype operators must be skilled typists and able to do routine clerical work, such as filing and keeping records. Teletype applicants must be able to type forty to forty-five words a minute. The trainees are given a four to eight week training course that includes the operation of various machines. The applicant must also be proficient in spelling, grammar, punctuation, and vocabulary.

Qualifications--The applicant must be accurate, dependable, able to work under pressure, and able to work well with others.

Advantages and Disadvantages--Experienced teletypists may advance to supervisory positions, and some become chief operators, instructors, or branch managers.

Paid vacations and holidays, retirement plans, and low-cost group life and health insurance are offered by most employers.

Sometimes there is continuous noise from all the machines being operated in the same office.

CORRESPONDENCE CLERK

Correspondence clerks are the people who answer most of the mail received by companies that get a large volume of mail not requiring managerial or executive action.

Correspondence clerks may handle all sorts of letters not ordinarily handled by supervisory or executive personnel. The correspondent analyzes problems, interprets, and applies company policy and philosophy to solve them. He may often follow established precedents in arriving at his solution.

The correspondence clerks get all the incoming mail. They may screen such mail for urgency and handle first those letters that appear to require immediate action.

The clerk keeps a file of all correspondence he receives and sends or routes the papers to another location for filing. He may be required to keep a tally of the amount of mail he handles.

History and Future--The job of correspondence clerk has become somewhat more complicated in the last fifty years due to the growth of business.

Fifty years ago when business owners began to employ helpers, a bookkeeper was usually the first to be hired. In addition to handling the books, he often was assigned to write letters to customers and, gradually, to answer more and more of the correspondence. As the business flourished, an employee might be hired specifically to read and answer all the mail. This correspondent often had more education than co-workers, and he was chosen for his literary ability.

Modern business and modern government is becoming more complex with each passing year. As a result, more and more correspondents will probably be needed.

Many areas of office work are becoming mechanized. However, automation does not pose any foreseeable threat to correspondents. Complaints, inquiries, and requests from customers and salesmen will always require personal judgment and individual attention.

Work Environment--Depending on the size of the correspondence and the amount of responsibility that goes with the job, correspondents have private offices or separate cubicles. However, they may work together in one large room.

Correspondence clerks normally work a 37 1/2 hour week. If a correspondent works for a company where there are seasonal ups and downs, he may sometimes have to work overtime to keep up with the mail.

Training and Education--A high school diploma is sufficient for some correspondence jobs. Some employers prefer college graduates, particularly if the position requires much responsibility.

The correspondent must be strong in grammar, spelling, and composition and must be particularly adept at expressing himself clearly and concisely in writing.

Qualifications--The correspondent clerk must speak clearly, so those taking dictation have no trouble understanding him. He must be attentive to details and rate high in clerical ability. He must be able to compose his own letters in a tactful and courteous manner, leaving the customer with a friendly feeling for the correspondent's company.

Advantages and Disadvantages--Beginning correspondents usually advance to senior correspondents after a year or two of experience. The next step may be to supervisor of a section or unit within the department, then to supervisor of all correspondents, and, possibly, to training supervisor of correspondents.

Correspondence clerks will usually receive the same fringe benefits that are given the rest of the company personnel. These benefits include medical, hospitalization, and life insurance programs, paid sick leave, holidays, vacations, pension plans, and other extras.

Many correspondence clerks are often working amid distractions such as the noise of telephones, personal conversation, dictating, and typing. Strain can build up when his concentration is interfered with by activity around him.

BROADCAST TECHNICIAN

The broadcast technician sets up, operates, and maintains the electronic equipment used to record or transmit television programs. He works with microphones, sound recorders, lighting and sound effect devices, television cameras, magnetic video tape recorders, and motion picture projection equipment. Broadcast technicians operate the quality of sounds and pictures being recorded or broadcast. They also operate controls that switch broadcasts from one camera or studio to another, from film to live programing, or from network to local programs.

In small stations technicians perform a wide variety of duties. In large stations technicians are more specialized.

History and Future--Television itself is a young industry. Color television, using satellites for signal transmission, is already an actuality. There are many developments in the minds of broadcast engineers which will continue to make broadcast engineering a promising and challenging career.

Work Environment--Most technicians in large stations work a forty hour week with overtime pay for work beyond forty hours. Many broadcast technicians in the large cities work a thirty-seven hour week. In small stations, many technicians work two to eight hours overtime each week.

Working conditions are usually pleasant. The work is done in clean attractive surroundings. Most of the work is done indoors.

Training and Education--The education normally required is at least a high school diploma plus technical or trade school courses. A good background in math, science, English, and social studies is important.

The potential technician must pass a series of written examinations covering the theory, construction, and operation of transmission and receiving equipment, the characteristics of electromagnetic waves, and the U.S. government and international regulations governing broadcasting. (Information about these examinations can be secured from the Federal Communications Commission, Washington, D.C., 20554.)

Qualifications--The applicant must have an interest and knowledge of electronics, plus a reasonable degree of manual dexterity and quick response to directions.

Advantages and Disadvantages--Most of the larger stations have hospitalization and sick leave plans, as well as vacation programs.

When a station is on the air twenty-four hours a day, the broadcast technician may be required to work on weekends and holidays.

LITERARY AGENT

A literary agent's primary function is to find the best market for his writer's works and to sell them for the best price and terms.

The relationship between literary agent and writer is somewhat similar to that of lawyer and client. A lawyer seeks to advance and protect his client's interest when dealing with a third party; an agent seeks to do the same thing for a writer.

The literary agent handles details for the established writer, such as recommending contracts for approval or rejection, checking on the copyright of a book, and handling requests for permission to quote.

The agent serves both beginning and established writers. He offers a sympathetic ear and friendly encouragement when his clients need it. He gives advice about the sales possibilities of new ideas. He serves as an impartial judge of new materials.

History and Future--The literary agent is a newcomer. The first literary agencies were started in New York City in the early 1900's.

At one time the majority of agents were men, but more and more women have entered the field, and some of them are very successful.

There seems to be room for as many literary agents as can prove themselves competent.

The challenge of the work is great, however. The success of a literary agent rests solely on his own merit.

Work Environment--A literary agent attempts to work only thirty-five or forty hours a week, although he usually has to work much longer. Much of his business is conducted over the lunch table or at dinner. If he has clients who are employed during the day, he will have to meet with them during the evening.

Most literary agents are located in New York, but some are located in other publishing centers.

Training and Education--There are no particular educational requirements for becoming a literary agent, nor is any special work experience required. Some high school and college courses, however, provide a valuable background.

In high school and college, one should take as many courses in literature and composition as possible. College courses in selling and accounting will help prepare for the business side of the job.

Qualifications--He must be able to judge a manuscript critically and express his ideas clearly, especially in conversation. He should enjoy working with people, and he must be tactful and understanding.

Advantages and Disadvantages--The literary agent is often self-employed; he can arrange his work schedule as he desires. Because he works in a creative field, he finds himself surrounded by vital and varied personalities.

A beginning agent can plan on long hours and lean years until he has a clientele whose work will sell and until he establishes a good general reputation among publishers and writers.

CAMERA OPERATOR

The cameraman or cameralady sets up and operates a power driven camera. He or she photographs scenes from angles and positions that are decided upon by the head cameraman and the director.

The cameraman must be able to use a variety of cameras, lenses, and filters to achieve a desired effect.

Cameramen who work for television stations, networks, or on newsreel crews are considered part of the working press. They are called newsfilm cameramen, and their specialty is motion pictures.

History and Future--The first cameraman appeared in 1927 in an experimental television program that was sent by wire between New York and Washington, D.C., by the Bell Telephone laboratories. In 1939 when Franklin Delano Roosevelt used television in opening the New York World's Fair, the general public realized that television was just around the corner. In 1942 several stations went on the air with regular television operation.

The employment outlook for cameramen is excellent because of the growth in media.

Work Environment--Cameramen usually work a thirty-six to forty hour week, except in special jobs or assignments. In some cases, hours include evenings, weekends, or holidays. Some outdoor work and travel may be required.

Training and Education--There is no age requirement for entering the field. However, high school graduation and some technical training are recommended or, better yet, a college degree in journalism. A candidate is likely to be at least eighteen or older.

Qualifications--The cameraman must be agile, dexterous, accurate in photographing and identifying the content of his films; imaginative, alert, outgoing, and tactful. He must be able to deal forcefully and diplomatically with a wide assortment of personalities, from society dowagers to convicted criminals.

Advantages and Disadvantages--There are opportunities for advancement. A cameraman advances as he becomes known for his outstanding work.

The cameraman must contend with subjects who do not want their profile taken, who insist upon a straight-on view, or who think a room should be arranged a certain way, their way. The cameraman listens silently to unsolicited suggestions while he does the job as he thinks it should be done.

PERFORMING MUSICIAN

People do not become musicians because they have talent and ability. Talent is necessary, of course, but no one who chooses the life of a performing musician usually does so because he loves music so much that no other life will satisfy him.

The division between serious and popular musicians is no longer clear-cut. Serious musicians may play popular music in studio orchestras, recording orchestras, or theater orchestras because there is much more money in the popular field.

There are many combination careers in music such as coaching, conducting choruses or church choirs, and playing for special occasions. Few jobs in music are really steady, so musicians often keep extra jobs in reserve.

History and Future--In the sixteenth, seventeenth, and eighteenth centuries the place of musicians in society was a stable one. Wealthy nobles and patrons supported musicians.

However, after the revolutions and wars of the early 1800's, noblemen had all they could do to support themselves. Musicians were left without support and for the first time had to appeal to the general public. Musicians thought themselves unfortunate but did give music back to the people.

The field of music continues to be highly competitive. There are many opportunities but not enough to ensure work for all musicians.

Training and Education--After completing high school, the future musician will need much more training, either in college or its equivalent. Today, even the popular musicians are getting a solid education in the basics of music, harmony, theory, and composition. Only the extraordinarily talented and lucky popular musician can get by without the ability to read music.

Qualifications--The musician must have drive, persistence, and the need to be in music. He must have patience, willingness to work long hours, and the ability to concentrate and to work well even under unpleasant conditions.

Work Environment--A performer's hours of work will be fairly irregular and sometimes unpredictable. Part of the day will be spent in rehearsing and practicing. Most of the actual work will be in the evenings.

Advantages and Disadvantages--One new opportunity for beginning musicians is the growing number of contests and competitions. These give young soloists a chance to be seen and heard, and being heard in competition can bring chances for a concert tour, a special performance, or study with outstanding teachers.

The world of music can be glamorous and exciting. However, hard work, patience, and unglamorous hours of practice and rehearsal lie behind all careers in music.

TELEVISION ANNOUNCER

An announcer is engaged in an exacting career. The necessity for finishing a sentence or a program at the exact second planned makes this a demanding and tension-producing career. It is absolutely essential, however, that the announcer be able to keep his audience ignorant of the tension under which he must work.

Announcers who cover sports events for the benefit of the listening or viewing audience are often known familiarly as "sportcasters." The sportcaster must have extensive knowledge of the sport which he is covering, plus the ability to describe quickly and accurately what is going on.

The announcer who specializes in reporting the news to the listening or viewing public is called a "newscaster." His job may be only the reporting of facts or it may include editorial comments. In some instances, the newscaster writes his own script. In other instances, he reads verbatim what comes in over the teletype machine. His delivery is usually dignified, measured, and impersonal. This type of announcing differs noticeably from the kind practiced by the sportcaster whose manner may be breezy and interspersed with slang or by the disc jockey who may try to be humorous or intimate and confidential.

History and Future--Credit for television invention cannot be given to any one man. The first commercially licensed television stations went on the air in 1941 in New York. They were stations WNBT and WCBW. Both suspended operations during World War II but resumed them in 1946 when television sets began to be manufactured.

The prospect for entry employment into announcing is moderately good.

In the past, employment opportunities for men were better than for women. However, women announcers are being employed in more than female-oriented programs.

Training and Education--Although there are no formal educational requirements for entering into the field of television announcing, many large stations are now chiefly employing those who have been to college.

A good background in history, geography, literature, the arts, political science, music, and the sound and structure of the English language is important.

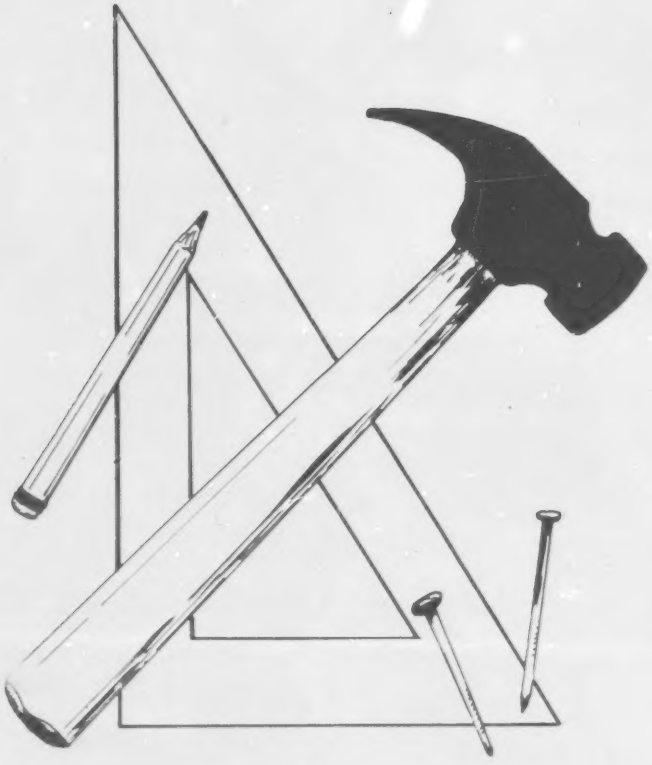
Qualifications--Poise and a pleasing voice and personality are of great importance to the prospective announcer. In addition, men and women who aspire to a career as television announcers must present a good appearance. Neatness, cleanliness, and careful attention to the small details of correct dress are important.

Work Environment--Working conditions are usually very pleasant. Almost all stations are housed in modern facilities and are kept at comfortable temperatures both summer and winter.

Advantages and Disadvantages--An announcer's job will sometimes take him among the great and famous. By being at the nerve center of an important communications medium, he will be more keenly aware of current issues and of divergent points of view than is the average person.

The irregularity of working hours may make for a difficult family situation at times and may cause interruptions in relationships with friends.

Construction



The activities of the construction industry touch nearly every aspect of our daily lives. The houses and apartments we live in; the factories, offices, and schools in which we work; and the roads we travel upon are examples of some of the products of this important industry. The industry encompasses not only new construction projects but also includes additions, alterations, and repairs to existing structures.

CARPENTRY FOREMAN

The carpenter works with wood, tile, insulation, board, and other related materials. He erects the wood framework in buildings and installs molding, paneling, cabinets, and hardware. The carpenter saws, fits, and assembles plywood, wallboard, and other materials. He uses tools such as hammers, saws, power saws, drills, and chisels.

The carpenter works either indoors or outdoors. He may work in a factory, an office building, or other large establishments.

History and Future--In the Stone Age, man built huts, bridges, and in spite of the crude tools he was forced to use, early man was a fairly good carpenter. Today man uses all sorts of tools in his work as a carpenter.

Job opportunities in carpentry will be plentiful throughout the next decade.

Work Environment--Most carpenters work on buildings. They also work on bridges, fences, docks, and other types of structures. Carpenters on large jobs work together as a crew.

Training and Education--The best training is received through on-the-job training which usually lasts four years.

Qualifications--Good manual skills are required. The carpenter must be accustomed to all types of weather. Good physical condition and mathematical ability are important assets of the carpenter.

Advantages and Disadvantages--A carpenter can usually find work in almost any area of the country. Benefits are reasonable if the carpenter belongs to a union. Advancement leads from journeyman to foreman to craft superintendent. If the carpenter knows construction well, he may become a building inspector or an appraiser.

Overtime work is common and certain hazards are found in carpentry work.

HOTEL CARPENTER

The hotel carpenter is among the skilled workers in the maintenance department of a hotel. He or she helps keep all equipment in good condition and is responsible for keeping all fixtures working adequately.

History and Future--The first hotel carpenter was employed in 1836 in New York's Astor House.

A fairly steady demand for hotel carpenters is expected to continue. Many thousands of openings result each year from turnover.

Work Environment--The hotel carpenter works in the maintenance department of the hotel. His work may be indoors or outdoors.

Training and Education--The training for hotel carpentry is the same as the carpenter's training which is an on-the-job training program for at least four years.

Qualifications--Good manual skills are required. The ability to get along with people and a mathematical ability are assets to the carpenter.

Advantages and Disadvantages--Work opportunities for the hotel carpenter are usually readily available in nearly all sections of the country. The pay is good and the work is usually interesting and varied.

The carpenter is exposed to all types of weather. He often works outside when it is very hot or cold.

CARPENTRY LABORER

The carpentry laborer works in manual occupations that generally require no special training. He or she assists the skilled carpenter and does much of the manual work. The job consists of loading, unloading, stacking, and carrying materials. They also clean up rubble and clear work areas.

History and Future--Laborers appeared when man first began gathering and using materials to build shelters. Throughout the years, the need for laborers in the construction industry has increased steadily.

Work Environment--The laborer assists the carpenter in building homes and office buildings. The work is done both indoors and outdoors.

Training and Education--No formal training is required of the carpentry laborer. However, apprenticeship programs are offered for those who wish to advance and better themselves.

Qualifications--He or she must be reliable and competent and enjoy working in the outdoors.

Advantages and Disadvantages--Wages are good and many laborers increase their education and advance to higher positions.

PIPEFITTER

The pipefitter installs systems to carry air, gas, oil, water, and various fluids in industrial plants. Pipefitters may specialize further in installing pipes to conduct gas from generating or storage plants to homes. He installs, services, and repairs the pipes of sprinkler systems in public buildings.

History and Future--Opportunities for employment for pipefitters are expected to rise moderately because of a high level of construction activity which is expected to continue and the increased amount of pipefitting required in home, industrial, and commercial construction.

Work Environment--The job of a pipefitter is strenuous and requires much standing and working in cramped positions.

Training and Education--The pipefitter is required to have a high school education with an average background in mathematics.

Qualifications--A pipefitter should have the ability to work with his hands. He should be able to visualize a complete job and its various details before he begins work on it.

Advantages and Disadvantages--Pipefitters have one of the highest wage rates of all skilled craftsmen. They are not as liable to seasonal layoffs as other workmen are and they can continue to work in bad weather since most of their jobs are done inside completed or almost completed buildings.

However, the work can be hard involving heavy lifting and working in cramped spaces.

WELDER

Welding is one of the most common and dependable methods of joining metal parts.

Welding is a method of joining pieces of metal by applying heat, pressure, or both, with or without filler metal, to produce a permanent bond. Although there are more than forty different welding processes, most of the processes fall under three basic catagories: arc, gas, and resistance welding. Arc and gas welding can be performed manually or by machine. Resistance welding is mainly a machine process.

History and Future--Many welders will be needed for maintenance and repair work in the growing metal working industries. The number of manual welders engaged in production work is expected to increase. The construction industry will need an increasing number of welders as the use of welded steel structure expands.

Work Environment--Safety precautions and protective devices are extremely important for welders because of the many hazards associated with welding. Welders use protective clothing, goggles, helmets with protective lenses, and other devices to prevent burns and eye injuries.

Training and Education--The prospective welder must complete grade school. He should attend a vocational school and have one to two years of on-the-job training.

Qualifications--Welding requires manual dexterity, a steady hand, good eye-hand coordination, and good eyesight.

Advantages and Disadvantages--Welders are often in contact with rust, grease, paint, and other elements found on the surface of the metal parts to be welded. Some welders use clear eyeshields or clear goggles as they generally offer adequate protection to these operators.

SHEET METAL WORKER

Sheet metal workers install ventilating, air-conditioning, and warm air heating systems in homes, offices, factories, stores, and other buildings.

Often when a new building is remodeled, sheet metal workers put in new metal fronts. They also construct metal kitchen equipment such as stove hoods, stem tables, and sinks for hotels, restaurants, and homes and make and erect the metal frames for giant outdoor billboards. Another important job is maintenance which includes keeping all kinds of installations and equipment made from thin metal sheets in good repair.

History and Future--For thousands of years, probably since around 5,000 B.C. men have worked with metal. Ancient man made jewelry and ornaments of gold, silver, and copper and pots and pans of copper, brass, and bronze.

Changing technological conditions will result in more demand for sheet metal workers as well as for new, more highly developed skills in this field.

Work Environment--Forty hours is the standard work week for sheet metal workers as it is for the majority of unionized building tradesmen. The demands of a particular job, however, may require the worker to put in more than eight hours a day and occassionally he may have to work on Saturdays, Sundays, or holidays.

Training and Education--The beginning sheet metal worker learns his trade both in class and through on-the-job experience under the guidance and supervision of skilled sheet metal workers.

The trainee should have an average background in reading and mathematics.

Qualifications--The trainee should be between the ages of seventeen and twenty-three, in good physical condition, and skillful in working with his hands.

Advantages and Disadvantages--The sheet metal worker is provided with such benefits as pension plans and health and accident insurance. Sheet metal workers in building construction make about $6.00 nationally. The present range of maximum union rates is from $4.95 in Charlotte, North Carolina to $8.00 in New York.

The workers may have to tolerate an environment that is dirty, noisy, too hot, or too cold.

SOFT TILE SETTER

The tile setter is a skilled craftsman and works primarily with the materials indicated by his or her job title.

The tile setter attaches tile (a thin slab of baked clay, stone, or other material) on walls, floors, or ceilings according to blueprints or other instructions.

History and Future--A moderate increase is expected in the employment of tile setters.

Work Environment--Tile setters are employed mainly in new building construction and in the large urban areas.

Training and Education--Training consists of 6,000 hours of on the job training in addition to related classroom instruction.

Qualifications--Applicants should have an eye for quickly determining the proper alignment for tile and should have a good sense of color harmony.

Advantages and Disadvantages--Skilled and experienced tile setters may become foremen. Others may be able to start their own small contracting businesses.

Growth of this trade will be limited by the increasing use of competing materials such as asphalt floor tile, structural glass, plastic tile, and plastic coated wallboards which usually are installed by workers rather than tile setters.

PLASTERER

The plasterer is a skilled craftsman who applies coats of plaster to the interior, ceilings, and partitions of buildings to produce a finished surface.

The plasterer uses such specialized tools as the darby (a board with a handle to apply and smooth the wet plaster), a hawk (a square board on which the wet plaster is carried), various floats (flat or right angled sheet iron pieces), and trowels.

History and Future--There are at present well over 50,000 plasterers in the United States. About 1,500 openings are created each year.

The employment of plasterers is expected to increase during the next decade because of the growing trend in building construction in our nation's economy.

Work Environment--The plasterer works in unfinished buildings or in those being remodeled. The work includes much standing, stretching, walking, stooping, bending, balancing, reaching, and climbing.

Training and Education--A three or four year on-the-job training is generally recommended as the best way to learn plastering.

Qualifications--The plasterer should have average intelligence, good physical health, manual dexterity, and hand-eye coordination.

Advantages and Disadvantages--This trade can be learned while being paid on the iob; therefore, there is no costly training period. The hourly pay of plasterers is one of the highest in the building trades.

In northern climates, construction work is considerably reduced in cold weather. This means plastering is a seasonal job in many parts of the country.

MARBLE SETTER

The marble setter installs shop made marble and artificial marble and structural glass when it is used in the inside of a building. The marble setter does little fabrication work because the marble and other materials are cut to size and polished before they are delivered to the work site.

History and Future--Employment in marble setting is expected to increase mainly because of the anticipated rapid expansion in construction activity.

Work Environment--Marble setter workers work indoors and outdoors depending on the types of installation. A large proportion of the marble setter workers are members of a union.

Training and Education--The completion of a three year on-the-job training is the best way to learn marble setting. A high school graduate or its equivalent is desirable.

Qualifications--Applicants are required to be between the ages of seventeen and twenty-two. Good physical condition and manual dexterity are important assets.

Advantages and Disadvantages--The excellent properties of marble as a building material will insure its continued use and provide work for marble setters despite the relatively higher costs of marble compared with competitive materials.

ELECTRICIAN (CONSTRUCTION)

The construction electricians lay out, assemble, install, and test electrical fixtures and wiring used in electrical systems. They also install and connect electrical machinery and communications systems.

The electrician furnishes his own hand tools such as pliers, screwdrivers, brace and bits, knives, and hacksaws. The employer furnishes heavier tools and equipment although in residential construction, heavier tools are not usually required.

History and Future--Employment of construction electricians is expected to increase very rapidly through the 1970's because of the anticipated large expansion in construction activity.

Work Environment--Most of the construction electrician's work is indoors; therefore, he is less exposed to unfavorable weather conditions than most other skilled building trade workers.

Training and Education--A high school education is required; courses in mathematics and physics are desirable.

Qualifications--Because improperly installed electrical work is hazardous, most cities require electricians to be licensed.

Advantages and Disadvantages--Hourly wage rates of construction electricians are among the highest in the skilled building trades. Electricians risk falls from ladders and scaffolds, cuts from sharp tools, electrical shock blows from falling objects, and burns from "live" wires. However, safety practices learned during training have helped to reduce the injury rate for these workers.

LINEMAN

The lineman constructs and maintains the network of power lines which carries electricity from generating plants to consumers. His or her work consists of installations, equipment replacements, repairs, and routine maintenance work.

History and Future--Several thousand job opportunities are expected to be available through the 1970's. Most of these opportunities will occur because of the need to replace experienced workers who retire, die, or transfer to other fields of work.

Work Environment--Linemen work outdoors, and in emergencies, they work in all kinds of weather.

Training and Education--An applicant can qualify for the job as a skilled lineman after about four years of on-the-job training and classroom instructions.

Qualifications--Candidates for line work should be strong, in good physical condition, and have no fear of heights. They must also have steady nerves and good balance work at the top of poles.

Advantages and Disadvantages--Linemen are among the highest paid transmission and distribution workers.

Their work is strenuous and there are some hazards when working with line wires.

CONSTRUCTION CHECKER

The construction checker carefully examines machinery, equipment, and tools of a construction company to make sure they are in good operating condition.

History and Future--The demand for the use of construction equipment is expected to increase substantially. Therefore, construction checkers will be needed to check the equipment.

Work Environment--Some of the work is relatively clean and free from dust, smoke, and fumes. However, many checkers work outside when it is hot and some are exposed to fumes of dust and smoke.

Training and Education--Some construction companies prefer the checkers with a bachelor's degree. Many companies do not require a degree, but rather train employees for a checker's position.

Qualifications--Applicants must be in good physical condition and have an aptitude for mechanical work.

Advantages and Disadvantages--Checkers are paid at one and one-half their normal rate for working more than forty hours a week or for working on Saturday. They receive premiums for working late shifts and double the hourly rate for Sundays or holidays.

CARPET LAYER

The carpet craftsman first inspects the floor to be covered to determine its condition. Then he plans his layout carefully to minimize waste of materials.

When installing the carpet, the craftsman may fasten tactless strips with tape or nails along the borders of the installation. (The strip secures the carpet when it is installed.) The tools used by carpet layers include: hammers, knives, shears, tape measures, chalk, chalklines, carpet stretching devices, and floor rollers.

History and Future--The projected increase in employment of carpet layers is expected mainly because of the expansion in construction activity.

Work Environment--Carpet layers generally work regular daytime hours; however, installing carpet in a store or office may require work during evening hours or on weekends when stores and offices are not open for business.

Training and Education--Most employers prefer high school graduates, but this qualification is not generally required.

A three or four year on-the-job training program is recommended as the best way to learn floor covering. Also, a good knowledge of mathematics is helpful.

Qualifications--Most employers seek applicants between seventeen and thirty years of age having at least average physical strength. A neat appearance and a pleasant business-like manner are important attributes because the work is performed on the customer's premises.

Advantages and Disadvantages--Carpet layers' work is usually not affected by weather conditions. During the winter months, most work is done in heated buildings. Job hazards are not numerous, but installers frequently experience knee injuries because they do much of their work while kneeling. Back injuries occur occasionally, as a result of twisting and lifting on the job. Most of these injuries can be avoided, however, if proper work procedures are followed.

PAINTER

The painter's first job, after he has set up his ladder and scaffolding, is to prepare the surface he is going to paint. Proper preparation is very important for a professional job.

Once he or she has prepared the surface, the painter mixes his paints to achieve the desired color. He must know the kind of material he is working on such as plaster, wood, metal, brick, concrete, cinder block, and others.

The painter uses three major tools to apply paints and coatings: the brush, spray gun, and roller. The skilled painter knows which one is best for each job.

History and Future--Leaders in the industry expect the total number of painters to increase moderately during the next several years. Some 17,000 jobs should be available each year for the next decade or so.

Work Environment--The painter works inside and outside. When he works inside, the rooms are usually heated so the paint or varnish will dry readily.

The painter's work is active and quiet strenuous. He stands, walks, stretches, and stoops all day long, day after day.

Training and Education--The following subjects should be helpful to students who are interested in a painting occupation: mathematics, drawing, art, social studies, and English.

Qualifications--Good health and a fairly strong physique are important qualifications. Other qualifications include the ability to work in high places, absence of allergies to paint and other materials used, good eye-hand coordination, good eyesight, good color discrimination, and no physical handicaps with the exception of hearing defects.

Advantages and Disadvantages--Maintenance painters usually have steady work, but many painters have days, weeks, and even months of unemployment. The winter months are usually the slow season for most painters.

CABINETMAKER

Cabinetmaking is one of the most highly skilled woodworking crafts in construction.

The cabinetmaker usually works from drawings, blueprints, and specifications of the object to be made. He selects the wood to be used and marks the proper size and shape on each piece. He roughly shapes the pieces of wood with a handsaw or a power band following the markings. He then trims each part to the proper size and smooths it with planers and sanders.

The cabinetmaker involved in custom work usually completes objects from start to finish. Some cabinetmakers may assemble and install prefabricated cabinets, cupboards, and counters.

Work Environment--Cabinetmakers usually work indoors under conditions that range from barely adequate to excellent.

The cabinetmaker uses hand tools such as chisels, planes, hammers, screwdrivers, drills, handsanders, and saws. Nails, screws, and glue are generally used in quantities. Paint, paint brushes, and often a spray paint gun are included in his equipment.

History and Future--In recent years, the increased demand for fine furniture and built-in units has increased the demand for skilled cabinetmakers.

Training and Education--A four year on-the-job training program is required following high school graduation.

Qualifications--The cabinetmaker should possess above average vision, eye-hand coordination, finger dexterity, and spatial perception (the ability to visualize an object to be made in three dimensions). Patience, creativeness, honesty, and imagination are also desirable characteristics.

Advantages and Disadvantages--Cabinetmakers who are self-employed may work longer hours than cabinetmakers employed in cabinet shops, and they usually earn higher incomes.

BLASTER

A blaster operates a machine that cleans castings by blasting them with air mixed with metal shots or grit. The castings may be smoothed by tumbling. In this process the castings, together with an abrasive material and sometimes water, are placed in a barrel which turns and the castings tumble against each other, thereby removing sand, burrs, and scale.

History and Future--More blasters will be needed because of an anticipated substantial increase in the production of metal casting to be used in household appliances, plumbing fixtures, and gas and water lines.

Work Environment--Working conditions have improved in recent years for blasters through the installation of modern ventilating systems. Also, new equipment has reduced heat fumes and smoke.

Training and Education--A beginning worker is given supervised on-the-job training for a period of four or five years, usually supplemented by classroom instructions.

Qualifications--Applicants must be in good physical condition.

Advantages and Disadvantages--The rate of injuries for blasters is high. However, in recent years employers and unions attempted to eliminate injuries by using protective equipment such as face shields, metal toe shoes, helmets, and safety glasses.

BULLDOZER OPERATOR

The bulldozer operator is identified by the type of machine he operates.

He or she helps clear land for a variety of large scale construction projects.

History and Future--The rapid rise in employment of bulldozer operators will occur mainly because of the anticipated growth in construction activity and the growing volume of highway construction.

Work Environment--The operating engineer works outdoors; consequently, he usually works steadily during the warmer months and experiences slow periods during the colder months.

The operation of a bulldozer is physically tiring because the constant movement of the machine shakes or jolts the operator.

Training and Education--A high school education or its equivalent is necessary to operate a bulldozer.

Qualifications--Skillful coordination of eye, hand, and foot movements are important. Also, physical strength is needed.

Advantages and Disadvantages--A bulldozer operator can advance to job foreman and, occasionally, to construction supervisor. Some can qualify for higher pay by training themselves to operate more complicated machinery.

Construction machine operators work outdoors in all kinds of weather. Dirt and noise are part of the job.

SURVEYOR (CONSTRUCTION)

The surveyor plays an important part in the construction of highways, airfields, bridges, dams, and other structures by providing information on measurements and physical characterisitcs of construction sites.

The surveyor determines the distance between two points and the precise measurements and locations of elevations, points, lines, and contours on or near the earth's surface. He or she is assisted by three workers when making the detailed measurements in the field.

History and Future--Employment opportunities for surveyors are expected to be favorable throughout the next decade. Among the factors expected to contribute to the favorable employment outlook is the rapid growth of urban areas which will create requirements for additional surveyors to locate boundary lines and to lay out streets, shopping centers, schools, and recreation areas. Construction and improvement of the nation's roads and highways will also require many new surveyors.

Work Environment--Surveyors usually work an eight hour day and a five day week. However, they sometimes work longer hours during the summer months when weather conditions are most suitable for surveying activities.

Training and Education--Employers prefer high school graduates with a good background in mathematics.

Qualifications--A surveyor should have sound health and a strong liking for outdoor work. Because most surveyors must supervise and direct the work of others, leadership qualities also are important.

Advantages and Disadvantages--Employment opportunities are limited for women because most of the surveyor's work is strenuous, most of the work is done out of doors, and surveyors may be exposed to all types of weather conditions. However, some of the surveyor's work is performed in an office.

CLEARING FOREMAN

The clearing foreman supervises and coordinates the activities of unskilled blue collar workers and is responsible for the equipment and material used by the workers for clearing areas for construction work.

Supervising workers is the most important part of the foreman's job. Many blue collar workers never work under supervisors above the rank of foreman, and it is through their foreman that they get their work orders, their discipline, and their recognition.

History and Future--The number of foremen in construction is expected to grow very rapidly due to the rapid expansion of construction work.

Work Environment--Working conditions of foremen vary widely from industry to industry. Construction foremen are often subject to unpleasant weather conditions.

Training and Education--Most workers who are promoted to foreman jobs are high school graduates who have learned their skills on the job.

Qualifications--Employers look for leadership qualities when considering persons for foreman positions. The foreman should also be able to motivate employees, command respect, and get along with people.

Advantages and Disadvantages--Some foremen who have limited authority may feel isolated, neither a member of the work force nor a significant part of management. On the other hand, the foreman position holds more prestige than that of blue collar workers and the work is often more challenging and rewarding.

CONSTRUCTION ENGINEER

The construction engineer may perform work in research, development, design, testing, planning surveys, or estimating equipment or structures necessary to the repair, installation, or building of construction projects.

History and Future--The outlook is for very rapid growth in the employment of construction engineers because of the continuous expansion of construction companies.

Work Environment--The construction engineer works in an office studying information gathered about the rock and soil formation on which to construct buildings or other construction sites.

Training and Education--The construction engineer must have a college degree. Before entering college, he must have a good background in mathematics.

Qualifications--The construction engineer must have a keen knowledge of construction methods.

Advantages and Disadvantages--Most construction engineers can expect increases in earnings as they gain experience.

Although engineers work under quiet conditions in modern offices, some have to work in mines if they are construction engineers.

Consumer and Homemaking Education

The field of home economics has broadened considerably in the last two decades, from the teaching of traditional skills to the teaching of consumer skills. The aim of home economics has remained consistent in the improvement of family living. Now the scope has been widened to include the welfare of the family in regard to its consumption practices. The purpose of consumer education is to educate families to be able to make the most of the resources at their commands and to enhance individual, family and social well being in the process.

FOOD SERVICE MANAGEMENT

A manager of any food service of whatever size must coordinate and direct the work of all the employees, from the chief in the kitchen to the busboy or porter. He or she directs such activities as hiring and training personnel; purchasing food, supplies, and equipment; keeping records and accounts; taking inventories; and making or approving menus. He must always be able to answer a customer's questions and to handle emergencies. Often he will also be responsible for advertising and handling public relations.

One of the manager's most important duties is to make sure health and sanitation regulations are observed. He must also supervise kitchen equipment, set food prices, and keep the staff happy. He often has direct contact with the customers, greeting them, establishing a friendly atmosphere, getting their suggestions about the food and service, and handling their complaints.

History and Future--The job outlook for food service managers is excellent for those with business sense, ambition, and a sound knowledge of the food industry.

Work Environment--A food service manager's job is usually not a nine to five occupation. Salaried managers often work more than forty hours a week; many times they work more than forty-eight hours. Their week can include weekends and holidays.

Working conditions are usually quiet, pleasant, air-conditioned, and sanitary. Though the manager will often be rushed in his work, he will almost always be able to take time during a slow period of the day to relax and perhaps have a cup of coffee and a piece of pie on the house.

Training and Education--Young people interested in food service management should graduate from high school and then go on to college or junior college.

A person's major in college could be hotel, restaurant, or institutional management. However, it could be business administration. College and junior college graduates with training in quantity food service are very much in demand and can usually advance quickly to managerial or supervisory positions.

Qualifications--A manager must have initiative, imagination, and ingenuity. He must have a knowledge of the food service industry that can best be acquired through education and experience. He will have to have a flair for salesmanship, a love of detail and accuracy, and a head for business.

Advantages and Disadvantages--The food service manager has a complex and difficult job, but it is rarely dull and hardly ever insecure. The food industry is expanding and is usually steady all year. People economize on many items, but they continue to eat. With rising standards of living and growth of the eating market, a good manager need never fear unemployment.

FOOD PREPARATION WORKER

The head cook or chef is in direct charge of the kitchen. The chef supervises the work of the entire staff. He is familiar with all the jobs done by the cooks. He sees that the food is arranged and garnished attractively for serving. He is familiar with the various cuts and grades of meat and may be responsible for boning and trimming them. Determining portions and using food economically and efficiently are among his duties.

History and Future--Cooking as a vocation may have originated when people began to travel away from home. In ancient and medieval times, inns accommodated tired travelers. As soon as cities began to grow, some of the more affluent citizens took to dining out, and those without families often depended on public eating places.

A good cook or chef is almost always assured of a job. Even in times of economic recession, people continue to eat out. There are many more openings for experienced cooks than there are people to fill them. With the expansion of the quantity food service business, openings will increase throughout the 1970's.

Work Environment--Modern hotel or restaurant kitchens, as well as kitchens of large modern institutions, are roomy and air-conditioned. Many kitchens, however, are small and crowded and likely to be very hot. In all kitchens, cooks must work standing up and at a very fast pace during rush periods. The work is, therefore, physically demanding.

Training and Education--Informal on-the-job training, apprenticeship, and vocational school education are three methods of learning the chef's job. Although high school graduation is not a requirement, most employers want young people who have completed high school, and they prefer those with some vocational preparation.

Qualifications--Food preparation workers should have the physical stamina necessary for long hours of standing without rest. Ability to work under pressure without becoming unduly irritable or nervous is a must, since most cooks work closely with other people, must often work quickly, and at all times must keep the customers satisfied.

A cook must have keen senses of smell and taste. Much tasting and sampling of foods is necessary in the course of preparing or working out new recipes.

Advantages and Disadvantages--Food preparation workers that are graduates of vocational schools have the best chance of advancing. Whereas the apprentice trainee generally begins as a kitchen helper, persons with vocational school background usually begin at a higher level and advance at a faster rate.

FOOD PROCESSING TECHNICIAN

The food processing technician deals with food products such as fish, dairy products, meats, vegetables, fruits, cereals, and grains.

He or she is responsible for buying the canned, frozen, fresh, or preserved food varieties best suited for the company's needs. The technician may work in the area of food production, making sure foods are stored at proper temperatures, processed under sanitary conditions, and that budgets are met.

History and Future--The food processing field is so large and varied that it can accommodate many different types of people. Often physical disabilities will not be a handicap. The employment outlook, for both men and women, is excellent.

Work Environment--Food technicians work in marketing, governmental inspection, warehousing and transporting companies, advertising and promotion, or wherever their specialized knowledge is needed.

Training and Education--A high school diploma is required. A prospective technician should attend a two-year college or technical school and earn an associate degree in food processing. Main courses in school should include chemistry, nutrition, basic food processing, English, and electives in advanced food processing courses.

Qualifications--A license is required for food brakers who do fat testing, bacterial testing, and sampling.

Advantages and Disadvantages--Salaries can go as high as $20,000. Some jobs require time spent outdoors, in traveling, in offices, or in laboratories.

INTERIOR DESIGNER AND DECORATOR

The creative work of interior designers and decorators enhances the attractiveness of our homes and other buildings. Designers and decorators plan the functional arrangement of interior space and coordinate the selection (including colors) of furniture, draperies, fabrics, floor coverings, and interior accessories.

Interior designers and decorators usually work directly with clients to determine preferences and needs in furnishings. They may also do "boardwork," particularly on large assignments. This includes work on floor plans and evaluation and creation of sketches or other perspective drawings in such media as watercolor, pastel, or tempera so clients can visualize their plans. They also provide cost estimates. After the client approves both the plans and cost estimates, arrangements are made for the furnishings. These arrangements are for the supervision of the work of painters, floor finishers, cabinetmakers, carpet layers, and other craftsmen and for the installation and arrangement of furnishings.

History and Future--A slow but steady increase in employment of interior designers and decorators is anticipated through the 1970's. Various factors should contribute to a greater demand for interior designers and decorators. Some of the contributing elements are population growth, larger expenditures for home and office furnishings, increasing availability of well-designed furnishings at moderate prices, growing recognition among middle-income families of the value of decorator's services, and increasing use of design services for commercial establishments.

Work Environment--Hours of work for decorators are sometimes long and irregular. They usually adjust their workday to suit the needs of their clients, meeting with them during the evenings or on weekends when necessary. Designers' schedules follow a more regular workday pattern.

Training and Education--The course of study for an interior designer or decorator usually includes design principals, art history, free-hand and mechanical drawing, painting, essentials of architecture as they relate to interiors, furniture and exhibition design, and study of various materials, such as wood, metal, plastic, and fabric. A knowledge of furnishings, art pieces, and antiques is important. Courses in salesmanship, business arithmetic, and other business subjects are of great value.

Usually the minimum educational requirement is completion of either a two or three year course at a recognized art school or institute specializing in interior decorating and design or a four year college course leading to a bachelor's degree with a major in interior design and decoration.

Qualifications--Artistic talent, imagination, good business judgment, and the ability to deal with people are important assets for success in this field.

Advantages and Disadvantages--Decorators and designers with ability may advance to department head, interior furnishings coordinator, or to other supervisory positions in department stores and large decorating or design firms; if they have the necessary funds, they may open their own establishments. Talented workers usually advance rapidly.

Self-employed decorators have an especially wide range of earnings. Their profits are related to the volume of business, their prestige as a decorator, economic level of their clients, their own business competence, and the percentage of wholesale prices they receive from the sale of furnishings.

CUSTOM DRESSMAKER

The custom dressmaker selects styles and fabrics that will produce flattering clothes with perfect fit. She must know how to use color, pattern, and her technical skill to disguise figure problems.

The dressmaker, however, does not usually try to keep an extensive stock of fabrics on hand. She may discuss fabric with the customer and then get swatches from a yard good or department store for the final choice, or the customer may purchase the material and pattern and bring them to the dressmaker. In either case, the dressmaker must know what fabrics will do, how to work with them, how they drape when made into a garment, and how they hold up under traveling, dry cleaning, and wearing conditions.

History and Future--Dressmaking is one of the oldest and most respected skilled trades. Before the days of modern garment factories and ready-to-wear clothing shops, all clothes, both men's and women's, were made for the individual either by a member of the family or by a professional.

Individually made clothes are a very desirable commodity, and many people prefer them when they can afford them. As the number of those who can afford them grows with the upward swing in both population and in the general economy, the need for skilled dressmakers becomes more apparent.

Custom dressmaking is not expected to expand in any spectacular way, but it certainly presents good opportunities for employment and self-employment to young people who strive for perfection in work.

Work Environment--Many skilled dressmakers work in department stores, ready-to-wear shops, and trade and vocational schools. A good many custom dressmakers work only part-time, usually in their own homes.

Almost every town in every section of the county has a dressmaker. Large cities, of course, have a greater number of dressmaking shops, both large and small.

Training and Education--The high school student who hopes to become a dressmaker should study art, design (especially as it applies to clothing), English, and business. The business and English courses will be especially valuable if one operates his own business. If vocational subjects such as tailoring or sewing are available, they should be included in the program.

After high school graduation, formal training in one's specialty, tailoring for instance, is desirable, either at a trade school, junior college, or in a tailoring or dressmaking shop.

Qualifications--Good eye-hand coordination, color discrimination, and finger dexterity are necessary. Personal traits should include patience, neatness, and accuracy.

A keen interest in clothes; an awareness of style and fashion trends; an understanding of form, proportion, fit, and color; and a knowledge of fabrics are essential.

Advantages and Disadvantages--Competition is very keen in the dressmaking field, not only from custom shops but also from ready-to-wear shops that offer clothing of good quality.

FASHION DESIGNER

The fashion designer is first of all an artist with a sense of line, color, and form. The tiny details, such as the special fabric or accessory are what distinguishes the designer from the dressmaker. The designer must know the basics of dressmaking. She must know how to draft patterns, cut fabrics and fit, drape, and sew the garment, but these are the skills she acquires to enhance her talent in design.

Unless the designer knows how to perform each step, she cannot supervise all the details of producing an original model. Also, she must be familiar with the problems of cutting and fitting in order to determine production cost.

The designer must be always aware of people and events that will influence fashion and of what will be acceptable to a fickle public. A routine part of her job is to attend the theater, to go to restaurants and clubs, and to travel widely in order to observe what is being worn and to anticipate future trends in design.

History and Future--Seventy years ago the American fashion designer was virtually unknown. Styles worn in the United States were created by designers in Paris or in other European capitals.

The fashion industry is expanding in the United States. New markets are developing in all areas of wearing apparel for both men and women. Although competition is great, there will be a market for new and fresh talent in fashion design as long as there is a market for clothes.

Work Environment--Fashion designers in the United States work in four areas: (1) designing for custom shapes, (2) creating patterns for home sewing, (3) designing clothes for mass production to be sold to department, clothing, and mail order stores, and (4) designing clothes for the theater, television, and moving pictures.

The greatest number of designers work for manufacturers who make clothes on a mass production basis. Many work for specialty apparel shops or for the custom departments of such stores as Bergdorf-Goodman, Nieman-Marcus, and Marshall Field and Company. Some designers own their own shops.

Training and Education--Firms employing designers usually expect them to have a college degree or from two to four years of training at a school specializing in fashion design. Even with this educational background, beginners spend considerable time in on-the-job training.

Some firms accept high school graduates after a competitive examination or a showing of their work; others take students who have completed two or more years of college work.

Qualifications--The two basic ingredients necessary for a career in fashion design are talent and stamina. A strong sense of color and form, a feel for the proper use of fabrics, and a flair for the unusual in design provide the young designer with a good start in the field.

Advantages and Disadvantages--Designers who are able to create original and appealing designs and who know how to sell may try free-lance designing while awaiting a chance at a full-time job.

While serving in lesser jobs before advancing to assist a designer, the beginner is able to see how a design department functions, and she learns about production costs and meeting the price lines of the manufacturer.

The pressures that exist in a designer's work are great and the designer must be versatile, cool-headed, and well organized.

The days just before a new collection is to be shown are particularly hectic, and the designer's skills are severely tested when long hours or last minute work makes for frizzled nerves, short tempers, and unexpected problems.

CUTTING ROOM OCCUPATIONS

Workers in the cutting room prepare cloth for sewing into articles of wearing apparel. There are five basic operations in the cutting department: spreading, marketing, cutting, assembling, and ticketing. Small shops may combine two or more of these operations into a single job. Most jobs in the cutting room are held by men.

Hand spreaders lay out neat bolts of cloth into exact lengths on the cutting board. Machine spreaders are aided by machines in laying the cloth evenly back and forth across the table.

In most plants markers trace the fiberboard pattern pieces on large sheets of paper and make several carbons of these tracings. Some plants that make men's and boys' suits and coats trace the pattern pieces with chalk directly on the cloth itself, rather than on paper.

A cutter cuts out the various garment pieces from the layers of cloth which are then spread on the cutting table. He follows the outline of the pattern on the cloth with an electrical cutting knife and cuts through all the layers at once. Sometimes layers of cloth are as high as nine inches. The work of a cutter and a marker frequently is combined into a single job of cutter-marker.

Assemblers, sometimes called bundlers or fitters, bring together and bundle garment pieces and accessories (linings, tapes, and trimmings) needed to make a complete garment. They match color, size, and fabric design and use chalk or thread to mark locations for pockets, buttonholes, buttons, and other trimmings.

History and Future--Employment is expected to increase moderately. Thousands of job opportunities are expected to result from employment growth. A considerable number of opportunities for young people will occur because of the thousands of experienced workers who will leave the industry. Most of the clothing industries employ more older workers than many industries do. It is estimated that deaths and retirements alone will provide 74,000 job openings annually.

Work Environment--Working conditions in cutting rooms are pleasant. In manufacturing establishments cutting is often performed in a separate area away from the main sewing and pressing operations.

Training and Education--Most workers enter the cutting room by taking jobs as assemblers (bundlers or fitters). Patience and the ability to match colors and patterns are necessary qualifications for these jobs.

Qualifications--Good eyesight and manual dexterity are essential for most production jobs in the apparel industry.

Advantages and Disadvantages--Cutters in the apparel industry can expect to lose very little work time as a result of strikes or other work stoppages because the industry has had many years of peaceful labor management relations. However, workers making certain types of garments may have layoffs of several weeks during slack seasons. Generally, such layoffs occur more often in plants making seasonal garments. In many plants, the available work during slack periods is divided so that workers can be assured of at least some earnings.

ADMINISTRATIVE OCCUPATIONS

The majority of the administrative positions in the apparel plant are in the production department. The production manager occupies a strategic position in apparel firms. He is responsible for estimating production costs, scheduling the flow of work, hiring and training workers, controlling quality, and supervising the overall production activities of the plant.

History and Future--Employment for administrators in the apparel industry is expected to increase moderately. Demand for apparel in the years ahead is expected to increase also. This will result mainly from increasing population and affluence.

Work Environment--Many apparel establishments, especially those in metropolitan areas, are housed in old buildings whose surroundings and facilities may frequently leave much to be desired. Newly constructed plants usually have ample space, good lighting, and air conditioning. Some of the new plants have cafeterias and health clinics with a registered nurse.

Training and Education--The administrator usually begins as a trainee. A college education is being required more often for these jobs.

Qualifications--The administrator should have a thorough knowledge of fabrics and a keen sense of color. He should also be acquainted with garment-making techniques.

Advantages and Disadvantages--Administrators work in shops that have union contracts. These contracts deal with such subjects as wages, hours of work, vacation and holiday pay, seniority, and health, insurance, and pension plans.

HOME ECONOMIST

Most home economists teach foods, nutrition, textiles, clothing, child development, family relations, home furnishings, and/or home management. Other home economists write articles and textbooks, do independent research, make speeches, or take an active part in professional organizations. Businesses employing home economists include public utility companies, newspapers, magazines, and food companies.

Home economists may also work in test kitchens, for dress pattern companies, or for the government.

History and Future--As a profession, home economics is about sixty-five years old.

The number of job opportunities for home economists is expected to be ample through the mid 1980's.

The demand for home economists with advanced degrees will continue to exceed the supply for some time.

Work Environment--Home economists in all areas enjoy pleasant working conditions.

Most home economists work between thirty-five and forty hours a week. Management level or supervisory jobs can require more hours but generally with greater workday flexibility. Weekend and evening work sometimes accompany jobs that involve public speaking or demonstrations.

Training and Education--A bachelor's degree in home economics is the minimum educational requirement. College teaching and a position in research and nutrition require advanced degrees.

High school students should prepare for college with the usual basic academic curriculum.

Qualifications--The home economist needs primarily an openness to change, concern about people and their needs, and an ability to make commitments and to recognize and appreciate differences.

Advantages and Disadvantages--In the past, most home economists have been women although a growing number of men are entering the field, particularly in the areas of food and institution administration, family relations and child development, and applied arts.

Home economics is one of the best routes to high-paying executive positions. To the average worker it offers good pay and other important satisfactions.

DIETITIAN

A dietitian assures the proper feeding of individuals and groups by planning nutritional meals for hospitals, institutions, schools, restaurants, or hotels. He or she also purchases food equipment and supplies, supervises chefs and other food service employees, and prepares various kinds of educational nutritional materials.

The dietitian works with people and for people. Whatever task she or he performs and wherever she works, she is dedicated to maintaining and improving health, enhancing the enjoyment of living, prolonging life, and even helping to save it.

History and Future--In 1920 there were only a few thousand dietitians in the United States, most of them in hospitals.

The outlook for those entering the field today is exceptionally promising because the demand for qualified people has already exceeded the supply.

Work Environment--Generally, working conditions are pleasant. Dietitians may work in offices, kitchens, or hospital rooms. Most dietitians work a forty hour week. There will be some weekends and irregular hours.

Training and Education--A bachelor's degree with a major in foods and nutrition or institutional management is necessary. A year of dietetic internship, which provides practical experience, is recommended.

Qualifications--The dietitian must be able to get along with all kinds of people and must have good business sense and an ability to handle details. She must like science and be able to make foods attractive and tasty.

Advantages and Disadvantages--The hours are irregular. Sometimes, especially at the start of a career, one may occasionally have to be on duty on weekends, evenings, and holidays.

Financial rewards compare very favorably with those of other professions.

Every day brings new challenges, new excitements, new chances to serve. Dietetics can be a lifelong outlet for talents, enthusiasm, and idealism.

EXECUTIVE HOUSEKEEPER

Executive housekeepers are responsible for keeping the institutions they serve clean and attractive. Each facet of the work must be carefully analyzed, and competent job descriptions must be written in complete detail. The executive housekeeper is responsible to management for screening and hiring the best personnel available. If, after careful training and indoctrination, employees do not measure up to acceptable standards, the housekeeper must be responsible for discharging them.

The executive housekeeper does much of the purchasing of supplies and equipment used by housekeeping personnel.

History and Future--About twenty-five or thirty years ago the executive housekeeper's occupation became a distinct career. Since then, the image of the executive housekeeper has changed from that of a mature, capable woman who brought experiences from her own home to the problems of the hotel or hospital housekeeping department to that of a trained business person who has experience not only with housekeeping but also with the administration of an extensive staff.

Executive housekeeping is a relatively new career in management and one that is still growing.

Work Environment--Executive housekeepers usually work a forty hour week, although those employed in hotels may work more. Employment tends to be quite stable.

Training and Education--The majority of today's housekeepers are not college educated. The young person who plans a lifetime career as an executive housekeeper for a large hotel or hospital is advised to obtain a college degree. A major in business administration or institutional management would provide helpful background.

Qualifications--The executive housekeeper must have the ability to organize his own activities as well as those of others. He or she should be able to supervise workers, teach them the fundamentals of housekeeping, analyze procedures and determine how they might be improved, and make independent decisions.

Advantages and Disadvantages--One of the greatest advantages is the good living conditions that are usually afforded the executive housekeeper. Many institutions provide laundry service, meals, and housing, usually a comfortable suite or apartment.

Other benefits include two to four weeks of paid vacation and the privilege of attending meetings pertinent to the job, with the opportunity for wide and increasing contacts.

Since executive housekeepers already hold the top positions in their field, they have few opportunities for advancement. Those who work in hospitals and other institutions may secure similar positions in larger institutions or may be promoted to general service manager.

PRE-SCHOOL TEACHER

The pre-school teacher does a variety of things not required of the elementary school teacher. He or she spends little time at a desk and a great deal of time actively working and playing with children, guiding them, and exploring with them. The teacher leads an active life that requires understanding, ingenuity, imagination, and a great deal of patience.

The pre-school teacher must confer with parents frequently. It is important that he win the parents' confidence and cooperation. When the parents and teachers work together, they can better understand the special needs of the children.

History and Future--Pre-school originated in England in the twentieth century. The first was designed to provide assistance for the poor, but in World War II when many mothers of small children went to work in factories and offices, the pre-school evidenced their services and accommodations to suit the neighborhoods in which they were located.

The need for good qualified teachers in pre-school continues to grow as more and more children begin their school experience long before entering first grade. Jobs are available in almost every part of the nation.

Work Environment--Hours of work vary. The pre-school teacher may work half days or full days. He or she also has to spend a certain amount of time beyond classroom hours either studying, conferring with parents, or planning each day's work. Government financed pre-school programs offer teachers in both rural and urban areas the opportunity to work year-round if they wish, thereby increasing their salaries about 20%.

Training and Education--High school students interested in pre-school education will find courses in social studies, English, and art helpful.

The majority of states require four years of college. Some states require a high school education and advanced or special preparation in child development.

Qualifications--The pre-school teacher must be in good health and have a pleasant personality.

Advantages and Disadvantages--An experienced pre-school teacher with a degree in child psychology can advance to become a director of a group of pre-schools.

The pre-school teacher must be able to ignore a certain amount of noise and to face minor crises each working day without a loss of temper or a case of nerves.

CHILD DAY-CARE WORKER

The major responsibility of the child care worker is to provide a learning environment for the children he supervises.

Each worker is responsible for a group of about eight children ranging in age from three to five years. The staff is concerned with developing the child's self-confidence and self-esteem.

The workers are very much interested in cultivating each child's imagination and his problem-solving abilities.

The administrative staff looks after the practical end of the child care center, such as finances, training programs, and personnel management. Usually the administrative staff and the group leaders work together to decide what types of programs need to be formulated and what objectives should be set.

History and Future--As our society becomes more service-minded, it is anticipated that there will be a great need for child care workers of all kinds. The fact that government and industry are paying more attention to the need for day care indicates that more people will be needed to fill positions in new programs.

Work Environment--Working conditions vary widely. Some communities have been fortunate enough to afford new centers, while others have had to make use of private homes that were remodeled for day-care purposes. Some industries have established day-care centers for employees' children. In order to meet state and federal licensing regulations, all day-care centers must be clean, safe, and have an appropriate staff.

Training and Education--A high school education is the minimum requirement for a day-care worker. Some centers require some form of on-the-job training, which includes basic theories of child development. A minimum of a bachelor's degree is necessary for advancement to the administrative level.

Qualifications--Patience is a major personal requirement for day-care workers. The day-care worker must exhibit concern for the children he supervises. Only a sincere interest in the development of children can make a day-care program successful.

Advantages and Disadvantages--A master's degree or doctorate is helpful for advancement to an administrative level.

EXTENSION HOME ECONOMIST

The extension home economist assists homemakers in the county in improving their home management, the nutritional content of their meals, and other aspects of their family living. They are responsible for keeping themselves well-informed and up-to-date in any area relating to the home and for communicating this new information to the women of a particular county or group of counties.

History and Future--Officials foresee an increased need for extension home economists to handle programs for low-income urban areas and depressed rural communities.

Work Environment--The economist travels to many homes, spends a number of evenings at small meetings, and works with various groups.

Training and Education--A bachelor's degree with a major in home economics is required. Some economists eventually teach on the college level, and a master's degree is needed for this. After college graduation, prospective agents must complete an in-service training program.

Qualifications--The economist must have a formal background. He or she must enjoy working with people and be able to teach. He must also be patient and have the ability to organize group projects.

Advantages and Disadvantages--The economist can advance by moving to more responsible positions within the county or by reassignment to a different county. Promotions may also be on a financial basis.

The work itself is taxing, both physically and mentally.

EXTENSION YOUTH AGENT

The extension youth agent works with boys and girls in 4-H clubs and other organizations by doing projects and activities. 4-H, a national program of 3.25 million young people, is concerned with an individual's fourfold development--head, heart, hands, health. The youth worker and trained local leaders guide boys and girls in planning and conducting a great variety of educational activities. 4-H is not a farm organization, for about half of today's membership belongs to rural nonfarm and urban families. The 4-H program has much to offer town and city youth as well as farm youth.

History and Future--In 1914 the extension service was established to serve people living in the rural areas and to bring up-to-date scientific information to them.

There is a growing trend for extension agents who specialize in working with youth.

Work Environment--The extension agent works an eight hour day, although his hours may be irregular. An important part of his job is attending meetings or giving speeches. Problems that call for special attention and research involve extra time and effort.

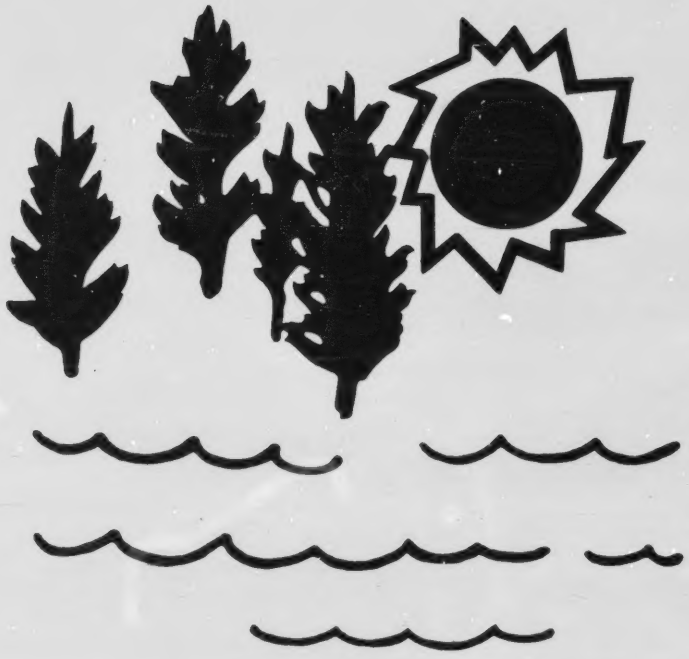
Training and Education--The minimum educational requirement for an extension agent is a bachelor's degree in home economics or some other closely related field. Agents must continually participate in on-the-job training programs.

Qualifications--The extension agent should have a pleasing personality, drive, leadership and administrative talent, and common sense. The frequent personal contact with the public in extension work calls for a strong interest in and understanding of people.

Advantages and Disadvantages--Extension agents are relatively well paid. They also receive federal employee benefits such as paid vacations, annual sick leave, and retirement, health, and life insurance plans.

The extension agent's pleasure is derived from working with many different people, the opportunities to apply his skills, and the satisfaction of performing useful services to a community and to the nation.

Environment



The environmentalist is concerned both with conditions as they presently exist and the preservation and maintenance of a representative amount of the natural environment. The federal, state, and governmental demands for persons with the required qualifications for environmental occupations gave rise to increased financial support to institutions interested in training persons for environmental occupations.

ENVIRONMENTALIST

The environmentalist is a specialist in promoting and protecting environmental health. He develops methods and carries out procedures for the control of the factors of man's environment that affect his health, safety, and well-being. These factors are food, drink, shelter, water, waste, air, disease-producing germs, rodents, insects and other vermin, chemicals, and other external and internal physical conditions of man's life.

History and Future--Records of attempts to control the environmental factors affecting health go back thousands of years. Most people at all times have tried to control those things they felt were a threat to health, but it has only been in recent years that concern for the preservation of vital natural resources has become general.

Employment opportunities for environmentalists having a bachelor's degree in environmental health are expected to be very good through the 1980's, particularly in private industry.

Work Environment--Jobs for environmentalists are available in most communities, but the majority of opportunities are concentrated in populous areas. There are also opportunities overseas with the Peace Corps, the World Health Organization, and other organizations.

Training and Education--A bacheior's degree in environmental health or in biological, physical, or chemical science is necessary for all beginning environmentalists. Preparation for entrance into environmental health work should begin in high school with a college preparatory program and emphasis on both science and social studies courses.

Qualifications--The environmentalist must be able to work harmoniously with others. He must know how to explain tactfully the need for corrections of unsanitary conditions and to secure cooperation. He should be an educator, a diplomat, and an arbitrator.

Advantages and Disadvantages--The environmentalist in some departments is provided with an automobile and a gas allowance. Insurance and health programs, pension, sick leave, and vacation time are provided for the environmentalist.

ENVIRONMENTAL HEALTH TECHNICIAN

Environmental health technicians assist engineers, scientists, and health agencies in promoting a healthy environment for man. They gather data on, inspect, and evaluate health facilities and services used by the public. Increasingly, they are dealing with air pollution, noise pollution, and other recently recognized hazards to environmental health.

Technicians employed in the field of environmental health work in health laboratories, water treatment plants, and sewage disposal plants, performing chemical and bacteriological analyses on samples of food, water, and other substances. They may be employed as sanitary inspectors and make unannounced visits to restaurants, hotels, and cafeterias to insure compliance with sanitation laws and regulations. They may work for food processing companies, enforcing legal standards of sanitation, purity, and grading.

History and Future--The future should bring many opportunities for environmental health technicians. Each year the nation's awareness of environmental problems increases, creating the demand and the backing for technician careers in air and water pollution, noise control, and other facets of protection for the public from unhealthy environmental conditions.

Work Environment--The conditions under which technicians work vary, depending upon the specialty within environmental health they choose. Generally, conditions are good.

Training and Education--The most widely accepted educational preparation is an associate degree or completion of two years of college, including twelve semester hours in mathematics and natural science, plus a year's experience as an environmental health technician trainee.

Qualifications--The applicant interested in a federal government position in the environmental health field must take a civil service examination for certification.

Advantages and Disadvantages--Technicians who go on to the baccalaureate or master's degree may advance to become water treatment operators, research technicians, or supervisors of groups of inspectors.

SAFETY ENGINEER

The major job of the safety engineer is to prevent loss due to employee injury and property damage. Specifically, he is concerned with the elimination of unsafe practices and conditions in industrial plants, mines, commercial establishments, construction operations, traffic, and places of public assembly.

The safety engineer often has occasion to recommend that certain procedures in the establishment be changed or that supplementary safety equipment be added to machinery. He studies accident records both in his own and in other establishments to determine causes of accidents; determining the causes can serve as a basis for proposing preventive measures. Not waiting for accidents to occur, the safety engineer examines specifications for job procedures, machinery, equipment, and structures from the standpoint of safety, well before construction or installation. He is concerned with the education and training of employees not only in safety procedures but also in being aware of hazards at all times.

Some of the specific activities in safety engineering are inspecting buildings, mechanical equipment, and property; investigating and reporting specific accidents; checking plants, specifications, contracts, and purchase orders from the safety viewpoint; designing improved plant layout or other changes in the environment to control hazards; selecting safeguards for machinery and other equipment for personal protection; and analyzing job procedures from the safety sandpoint.

In his work to promote safety education of employees and the public, the safety engineer may set up safety rules, check to see that such rules are followed, organize safety committees or councils to maintain interest within the establishment, and secure the cooperation of the establishment's management, workers, and unions that may be involved. He may run contests, special drives, and special campaigns to publicize the need for safety. He may set up bulletin board displays and write brochures for distribution.

History and Future--Compared with other branches of engineering, safety engineering is young, and, like most youngsters, it is still growing. One of the factors leading to increased demand for safety engineers is the constant development in industry of new production methods, new machinery, and new materials. Use of atomic energy may call for radical departures from traditional safety methods and for exceptional imagination in reducing radiation danger. The increasing interest of labor unions in the subject of safety is resulting in new legislation, which in turn will require industry to employ more safety engineers to advise on proper safety measures.

Work Environment--A safety engineer may spend much of his time in the field, as much as seventy-five percent if he is working for a large establishment. As a loss prevention officer, he is called on in emergencies at any of the company's plants, even though each plant has a supervisor directly responsible for safety.

The greater number of safety engineers work in the highly industrialized sections of the country, such as the middle Atlantic states, East North Central states, and the manufacturing centers of the South and West. They are employed in industry, construction, mining, manufacturing, transportation, and distribution.

Training and Education--A high school diploma is a must to qualify for a safety engineer. A prospective safety engineer should take courses in mathematics, chemistry, and physics. He should have a knowledge of industrial hygiene, physiology, industrial psychology, and a general knowledge of plant management, insurance, and workmen's compensation laws.

Qualifications--Mental alertness, tact, and persuasiveness are important for success in the field of safety engineering.

Advantages and Disadvantages--There are good opportunities for advancement in the field. The various job titles held by members of the American Society of Safety Engineers show the wide variety of occupations in business, government, and industry in which the safety engineer may engage: president, vice-president, general manager, chief engineer, district manager, and divisional director.

INDUSTRIAL HYGIENIST

The industrial hygienist is constantly on the alert for possible hazards. He must know what materials are being used and how they affect workers. He must also be familiar with manufacturing processes and operations.

The hygienist must determine whether a hazard is immediately dangerous, whether it may endanger a worker's health only after long exposure, or whether it is well under control. To do this, he may take air samples to ascertain the concentration of lead or fumes in the air, or he may run blood tests to see if a worker is allergic to toxic gas. The results of these tests and analyses enable him, with the aid of the safety engineer, to design controls that will eliminate or minimize these dangers.

History and Future--Industrial hygiene is expected to grow; the need for capable and qualified personnel is great and should become even greater. The growing concern with air and water pollution will undoubtedly create many opportunities in environmental control, of which industrial hygiene is an important part.

Work Environment--Industrial hygienists working for big industries are primarily concerned with the immediate environmental problems likely to be encountered in the plant. This is definitely not a nine-to-five job; the industrial hygienist has the primary responsibility for setting up and maintaining safe and healthy working conditions and practices.

Training and Education--The basic qualification for an industrial hygienist is a college degree with a major in engineering or in one of the biological or physical sciences.

The student should select high school courses that prepare him for college, including chemistry, biology, physics, and mathematics.

Qualifications--The industrial hygienist should have a genuine interest in science and the ability to apply knowledge in a practical manner. He must possess a keen sense of responsibility. He must have the ability to work well with people.

Advantages and Disadvantages--The industrial hygienist may have to work long, tedious hours to obtain solutions to presenting problems. However, the compensations are excellent.

BACTERIOLOGIST

Bacteriology is a specialized branch of biology. The bacteriologist studies the growth, structure, development, and general characteristics of bacteria, viruses, molds, and other organisms of microscopic size.

The bacteriologist isolates and makes cultures of significant bacteria or other microorganisms, controlling such factors as moisture, temperature, and nutrition. He identifies microorganisms and observes their action upon the living tissue of plants, higher animals, other microorganisms, and dead organic matter. He makes chemical analyses of substances such as acids, alcohols, and enzymes produced by bacteria.

History and Future--The cooperation of thousands of scientists studying the effects of microorganisms on nutrition, disease, reproduction, growth, and the like has resulted in the vast development of microbiology in this century.

Bacteriology is one of the fastest growing areas of life science, and opportunities are expected to be excellent at all levels of education.

Scientific advances in current problems and ecology have created new and exciting possibilities for bacteriologists of the future.

Work Environment--The bacteriologist's working space is extremely clean, well lighted, and ventilated. It is usually a laboratory, where he may be responsible for the work of assistants, technicians, and students.

Bacteriologists ordinarily work a standard eight hour day and five day week. They might have night or weekend duties in certain laboratories that operate continually, such as those in hospitals or those engaged in special research projects.

Training and Education--High school students interested in bacteriology should take all the science and mathematics courses available to them, begin their language training early, and acquire proficiency in the laboratory.

A bachelor's degree with a major in microbiology is required. A Ph.D. is necessary for those who wish to get ahead.

Qualifications--Bacteriologists should be curious, patient, systematic, and have an aptitude for science.

Advantages and Disadvantages--A bacteriologist can advance to the position of project chief and direct a team of other bacteriologists. A bacteriologist can also advance by progressing from strictly technical assignments into positions in which he interprets bacteriological knowledge.

The bacteriologist must be careful to guard against dangers from burns, cuts from glassware, and injuries from improperly used chemicals.

PEST CONTROL OPERATOR

Pest controllers are employed to mix and prepare insecticides, load trucks with supplies, or solicit new accounts for their company. Most of these people, however, have had training and experience as pest controllers and are qualified to do insect and rodent control work in case of emergency or during rush periods.

While the controller is performing his duties, such as spraying, dusting, or setting out bait, the serviceman looks for ways in which the customer can improve pest control. If he sees uncovered refuse pails, poor drainage areas, or broken walls through which pests can enter, the responsible serviceman points them out to the person in charge.

History and Future--As scientists and physicians gradually learned more about diseases and epidemics, they discovered the causes. Certain insects and animals were found to be major carriers of disease. Eventually, laws were passed in all communities establishing standards of sanitation to control the spread of vermin. Today, departments of health and sanitation enforce such laws by inspection and advise the community of the danger of unsanitary conditions.

Because pest control operators are an important part of the continuing program of public health and sanitation in all communities, there is a constant demand for pest control services and for qualified pest control personnel.

Work Environment--The average workweek is forty to forty-four hours over a five day period. Some men do Saturday or Sunday work or are on call on these days for emergencies.

Employees who have been with a company for at least two years usually get a two week vacation. Many companies schedule vacations to take place during the winter or fall because insects, birds, and rodents are most active in spring and summer.

Training and Education--A high school education is preferred by most employers. Experience or demonstrated ability in previous jobs may be accepted in place of a high school diploma. Helpful courses include chemistry, English, and mathematics. Many pest control companies now seek college graduates with degrees in entomology.

Qualifications--The pest controller should be friendly and courteous at all times. Because the results of his work are not always immediately apparent to the customer, the serviceman should be abie to explain his company's full pest control program.

Advantages and Disadvantages--Some chemicals can be harmful if inhaled or brought into contact with the skin. Pests and rodents are neither attractive nor pleasant, and the serviceman may have to explore dirty, dusty places in seeking out nests and breeding areas.

On the other hand, the controllers work independently, without supervision. They deal with many people in the course of a day. The variety of pest problems add interest to their work. The knowledge that their efforts contribute to health and property protection and to their customers' peace of mind brings considerable satisfaction.

PARK AND RECREATIONAL MANAGEMENT TECHNICIAN

The park and recreational technician supervises outdoor recreational services and facilities in public or private parks, forests, rangelands, mountains, desert areas, and seashores. He also protects wildlife and natural resources.

The technician in a park would have charge of the day-to-day operations of maintaining the area. He would make landscape plantings, maintain grounds, and direct people to various areas of interest in the park.

The technician working at a ski resort or public golf course would be responsible for plantings to landscape the area and turf. He would work with landscape architects in the planning of site development so he would know the needed maintenance.

History and Future--The national park system had its beginning in 1872, when President Ulysses S. Grant signed an act of Congress establishing the Yellowstone region as a "public park or pleasuring ground." This was the first national park in the world, and in the years that followed many other areas were set aside for public enjoyment. The National Park Service was established in 1916 to manage the various national parks, monuments, and historic sites.

At present there are more opportunities than people to fill them in both permanent and summer jobs. The rapid growth of the recreation business will lead to a rapid increase in the need for personnel to manage and maintain facilities. Spending for recreational pursuits has increased much faster than the population. It is estimated that over a million jobs will be available in the field of recreation by 1980.

Work Environment--The park and recreational land technician works outdoors. He must love the outdoors because he will have to work under all kinds of extreme weather conditions. Although he usually works a forty hour week, his hours are often irregular during major tourist seasons.

Training and Education--The high school student should prepare himself for a two year technical college by taking courses in mathematics, earth science, biology, chemistry, ecology, and English.

Qualifications--The technician must be able to meet and talk with all types of people, work with management, direct employees, and often assume the role of both an employee and an employer. Above all, he must enjoy working outdoors.

Advantages and Disadvantages--The technician is in constant contact with the public. He must remain calm in times of crisis, since there may be times when people's lives depend on his resourcefulness and flexibility during moments of great stress.

However, loving the outdoors and playing a major part in conserving, maintaining, and enlarging our natural resources bring a satisfaction not found in other kinds of work.

PARK NATURALIST

Park naturalists perform scientific and professional work in connection with the natural history and conservation programs of national, state, and municipal park and conservation services. They are responsible for the scientific study of the areas to which they are assigned and the education of the people using or otherwise concerned with these natural facilities. For the most part, their work is concerned with the study, research, management, and protection of the natural features of their areas.

Naturalists preserve scientific specimens and records, plan and prepare museum exhibits, advise on methods of preserving natural history features, operate museums and information centers, conduct guided field trips, and prepare and give illustrated and non-illustrated talks in national and state parks and in nearby communities. They may take pictures either on slides or movie film to illustrate their talks.

History and Future--This field is a small and specialized one. Most vacancies occur because of retirements and deaths of present employees. Promotions of qualifieid aids and other workers fill the vacancies.

Work Environment--The park naturalist spends most of his time out-of-doors, often walking and talking to groups he is conducting on tours. At other times, he works at his desk preparing talks, explaining the area and its wildlife and plants to visitors, writing articles for magazines or newspapers, and compiling records.

The work is not considered seasonal. The extra work of the busy season is carried on by part-time workers. The park naturalist in one of the state or national parks may be stationed far from his home.

Training and Education--The high school student interested in becoming a park naturalist should take courses in biology, botany, zoology, and earth science. After high school a bachelor's degree should include major study in botany, zoology, geology, ecology (the study of wild plant and animal life in its natural state), natural history, forestry conservation, and park management with at least twenty-four hours in botany, ecology, or zoology.

Qualifications--The park naturalist should have patience, tact, poise, a sincere love of the out-of-doors, interest in the conservation of wildlife, and the desire to teach others about it. He must be reliable, industrious, responsible, emotionally stable, alert, imaginative, and have a desire to increase his knowledge of nature. The aptitude to develop a pleasant but firm attitude in enforcing rules for the protection of wildlife is also necessary.

Advantages and Disadvantages--The usual fringe benefits available to all civil service employees apply to the park naturalist. These include retirement benefits, hospitalization, vacation time, and sick leave.

The work is not considered hazardous and is varied and interesting to the qualified person. Much of the park naturalist's work involves meeting with people, including professional foresters, residents, tourists, and seasonal employees whom he supervises.

URBAN AND REGIONAL PLANNER

Until the 1960's, most planners were primarily concerned with the physical growth of the cities. This is still an important part of the work of many planners. They are interested in a comprehensive plan that will be a guideline for the future growth and physical development of a city. Such a plan shows the proposed use of the land, whether it be residential, industrial, or commercial areas, open space or recreation, as well as the distribution of public facilities such as roads, transit, schools, and parks.

The main concern is for unifying the social, economic, and physical development of the community and its environs in a way that will satisfy the citizens' objectives.

History and Future--In the United States planning has progressed slowly from the idea of "the city beautiful" to "the city practical." Artists and other public-spirited citizens have sponsored small projects to beautify the ugliness of city life.

The prospects in the field of planning are excellent. Job opportunities are being created as a result of new federal and state legislation to improve our physical, social, and economic environment.

Work Environment--Planners work with metropolitan areas, states, or an entire nation. When they work with larger areas, they are typically concerned with broader issues such as the development of a state's economy, use and conservation of natural resources, and improvement in health care and in education.

Training and Education--A high school student should prepare for a program leading to a liberal arts degree in a field related to planning, such as political science, geography, or architecture, and then study two or three years at the graduate level in a specialized school to earn a master's degree in planning. It is possible to get started with a bachelor's degree in planning, but work at the graduate level is recommended. For specialized teaching or research work, a doctor's degree is usually required.

Qualifications--The most important qualities of a good planner are a capacity to analyze difficult problems and to come up with imaginative ways of meeting them, a commitment to social and environmental change that will offer full and equal opportunity to all Americans and wipe out the grim heritage of poverty and racial injustice, and a desire to work with people and to help them in developing their preferred solutions to the problems that most concern them.

Advantages and Disadvantages--Planning is a young profession and the need for qualified planners is great. Planning is a respected and important profession. The planner works with the leading citizens of his community. When his plans are accepted, he finds his job extremely gratifying.

Sometimes there are limitations to what a planner can do. He may have to modify his plans to satisfy various groups. Then, too, he must be patient; in some instances, he must wait many years before he sees the results of his work.

TREE EXPERT

The main job of the tree expert is pruning or trimming trees. Starting at the top of the tree, he works his way down, removing dead and diseased or weak branches with a saw or a pole pruner. One kind of pruning is line clearing in which the tree expert removes branches that might rub against telephone or electric lines. Another kind of pruning is shaping. Here, the expert prunes certain branches to give the tree a more pleasing shape.

After trimming, the tree expert brushes the cuts with a wound-healing paint that prevents insects from attacking the tree at the exposed area. He carries his paint and brush in a can hung on his belt. The expert is always on the lookout for possible wounds, and he paints all those bigger than the size of a dime.

Another important job of the tree expert is filling cavities or holes in trees. This retards decay and strengthens the tree, possibly saving it from premature death.

History and Future--As both governmental agencies and individuals seek to improve the environment in our cities and suburban areas and to conserve natural resources, the need for tree experts multiplies.

There is a growing demand for well-trained tree workers, and many tree service companies are actively recruiting qualified young people. This means good opportunities for those with the necessary interest to learn the trade.

Work Environment--Most of the tree expert's work is done out-of-doors. When the weather is bad, he usually cleans and repairs the equipment he uses. The work is done year round, even in winter.

Training and Education--Students planning to enter the field of working with trees should take high school courses in biology, botany, chemistry, mathematics, horticulture, and agriculture.

Qualifications--The tree expert must have good health and considerable physical strength. He must be able to climb trees and handle heavy tools. He also needs a good sense of balance and steady nerves, for he often has to work high above the ground. He should have mechanical aptitude, for he will be operating saws, cranes, and other power equipment.

Advantages and Disadvantages--The tree worker constantly runs the risk of injury as a result of a fall from a tree or from working with power and handtools. Proper safety measures, of course, minimize these hazards.

Tree experts are covered by the workmen's compensation laws of the various states and enjoy a number of other fringe benefits, depending on the size of their companies.

RANGE MANAGER

The range manager oversees the use of the grazing land. He must select the best type of grass for grazing purposes and see that the land is properly seeded and conserved. He determines the number of livestock permissible for grazing so that areas are not overburdened or depleted, and he ensures the observance of regulations by lease holders.

The range manager must be knowledgeable in the use of insecticides, in disease control, in the use of firefighting techniques, and in soil reclamation science.

The range manager keeps records, makes reports, researches problems affecting his area, and provides technical assistance to holders of privately owned grazing lands.

History and Future--Employment opportunities are expected to be good for range managers throughout the next decade. Growing numbers will be needed to aid in the expansion of the range facilities and to extend much needed technical assistance to emerging nations in different parts of the world.

Work Environment--Depending upon the area in which one works, conditions vary greatly. Those involved in teaching range management follow regular university and college schedules and work in pleasant surroundings. Those who go into public or private rangeland management should expect to work out-of-doors almost continually, regardless of weather conditions. Since the acreage involved is always large, it is often necessary to spend time away from the home base and to work in isolated areas far from contact with other people or recreational facilities.

Training and Education--Individuals interested in becoming range managers should hold a bachelor's degree in range management or in a related field such as soil conservation or agronomy. Preparatory courses in high school should include chemistry, mathematics, English, and physics.

Qualifications--The applicant should be in good physical condition, able to talk to people, and to write both speeches and reports.

Advantages and Disadvantages--The work is often lonely and arduous, requiring both discipline and maturity. It provides the interested individual with great freedom of operation, a decision-making role, and an enormous sense of accomplishment.

RECREATION WORKER

Recreation workers help people to enjoy and use their leisure time constructively by organizing individual and group activites and by administering physical, social, and cultural programs for all age groups at camps, playgrounds, community centers, and hospitals. They also operate recreational facilities and study the recreation needs of individuals and communities.

History and Future--Employment of recreation workers is expected to increase very rapidly. Several thousand recreation workers will be needed annually. In recent years the number of college graduates having a major in recreation has fallen far short of the demand for recreation workers.

Work Environment--The average workweek for recreation workers is forty hours although some work fifty hours per week. A person entering the recreation field should expect some night work and irregular hours.

Training and Education--Most employers in the recreation field prefer persons who have a bachelor's degree and a major in recreation, social science, or physical education.

Persons interested in becoming recreation workers should take courses in philosophy, the humanities, natural sciences, and the arts.

Qualifications--Good health, emotional maturity, and a warm personality are essential qualities for recreation workers.

Advantages and Disadvantages--Opportunities for advancement to administrative positions often are limited for persons who have no graduate training.

Most public and private recreation agencies provide from two to four weeks vacation and other fringe benefits, such as sick leave and hospital insurance.

Fine Arts and Humanities

The scope of the humanities encompasses those studies and activities concerned with the social, moral, and aesthetic values of a culture. The fine arts, as opposed to the applied arts, are concerned primarily with aesthetic expression. The arts strive to function as a vehicle for varied and profound expressions of thoughts and feelings and to serve the development of man's highest technical skills.

FINE ARTISTS

The fine artist may specialize in painting, sculpture, photographic art, or graphic art.

The painter specializes in certain types of subject painting, such as still life, landscapes, seascapes, or portraits. He may make preliminary sketches of the scene he intends to paint and return to his studio to finish it, or he may paint on the spot.

The sculptor may work with clay, shaping a model which is used for reproducing the object in bronze or concrete. Some carve objects from stone, wood, or concrete using chisels, hammers, and other hand tools.

The graphic artist is concerned with making wood and steel engravings and wood blocks.

History and Future--Since the dawn of civilization, man has gained pleasure by expressing himself through painting, drawing, architecture, and sculpture. In many instances these have been the only source from which archeologists and historians have learned of the history of ancient civilization.

The employment outlook for good fine artists is expected to be moderately good throughout the next decade.

America is undergoing a surging interest in art. Landscape, seascape, or portrait artists with exceptional talent should be successful in selling their paintings.

Work Environment--The fine artist usually sets his own working hours. He may do his painting during the day, night, or on a weekend.

The artist may paint or sculpture only what he desires and then exhibit and sell his work at art galleries or other private showings. Some artists teach in professional art schools or in college or university art departments.

Training and Education--High school courses in social studies, science, and foreign languages could be helpful in developing a cultural background necessary for serious art.

Many established artists agree that a strong, broad educational background is helpful. Some feel an art training program with several courses in psychology is helpful, since artists paint people, express ideas, and depict human emotions.

Qualifications--Artists should be patient, persevering, and ambitious. They should have a fine sense of color, depth perception, and balance. Good eye-hand coordination and finger dexterity are necessary.

Advantages and Disadvantages--Fine artists may earn from barely enough to pay for their materials to thousands of dollars for each of their works. While a few artists support themselves solely by their art work, most find it necessary to supplement their incomes.

COMMERCIAL ARTISTS

The commercial art field is so broad that newcomers are advised to specialize in a particular branch.

Advertising artists are probably the best known workers in commercial art. Artists employed by an advertising agency or an art studio work on television commercials, as well as such printed materials as booklets, folders, displays, packages, and labels.

The illustrator usually has a particular style that lends itself to some specific form or illustration. He may be best at black and white or full-color drawings for short stories and articles, or his style may be best suited for illustrations for books, advertising, or fashion publications.

Fashion illustrators create pictures of clothes and accessories to go with the printed words.

Graphic designers create layouts for the printed page for advertisements, magazines, books, and brochures. They select specific art or photographs, do hand lettering, choose typefaces, and arrange the materials to attract the eye.

History and Future--One of the first things early man did was teach himself to draw. After he had satisfied the basic need for food and shelter, he became aware of a desire for something more--the communication of his ideas to those around him.

Thus, the artist was born. Through the centuries before the development of wiring, man expressed himself by drawing on the walls of caves, on stones, and even on tree bark. This need to tell others of his joys and fears was very strong.

In our age of mass communication, we continue to call upon the artist to help us express our ideas, but his work has become considerably more refined and sophisticated. Today, the artist is a specialist.

The job trend for commercial artists during the next decade appears good. Job opportunities will vary, of course, depending on the area of specialization.

Work Environment--Artists usually work thirty-five to forty hours a week. When they are under pressure to meet a deadline, they work longer. The artist may work alone or in a roomful of artists, and his working area or studio is generally well lighted and ventilated. Most of the work is done at a drawing board.

Training and Education--The prospective artist should attend an art school or institute that specializes in teaching commercial or applied arts. Entrance to the school usually requires graduation from high school, where math, science, literature, and history should be included in the artist's curriculum to provide the necessary background.

Qualifications--The artist must have good judgment concerning color and line harmony, a keen sense of beauty, design, and form, and manual dexterity. The ability to follow instructions carefully and to have work ready at the time specified by the customer is also very important.

Advantages and Disadvantages--The field of art can be extremely rewarding for the creative person. He has the opportunity to play with ideas, to keep finding new ways to solve problems, and to enjoy the satisfaction of seeing his ideas take shape and develop.

One of the disadvantages the artist must contend with is the rush period. At times there will be deadlines to meet, and the artist will have to work overtime and under pressure.

Women usually are interested in the fact that this is one of the few careers that can be carried on at home after marriage if they wish.

ARTIST'S MODEL

The work of the artist's model is to pose for an individual artist or for a class of art students. In posing he or she must stand or sit in one position for several hours at a time. Permission to relax is given once during each hour. Often the model must pose on a platform under hot and bright lights and sometimes wear little or no clothing. One job may last a day, another for several weeks.

History and Future--Ever since there have been artists, there have been models who posed for them. In earlier times, many of these models were paid to do so, but were, in fact, the wives or sweethearts of the artists.

There will always be a need for well-qualified artist's models; there are probably entry positions for more than 500 each year. Since at least ten times that number try to become models each year, chances for success are only about one in ten.

Work Environment--The artist's model usually works indoors in a loft, a studio, or a classroom. These rooms may be large and drafty with high ceilings and inadequate heating or cooling facilities. The more modern art schools, however, will be well heated, well ventilated, and well lighted. The model may wear ordinary street clothing, an exotic costume, or pose in the nude.

Training and Education--There are no standard educational requirements for models, but most employers prefer a high school graduate.

Qualifications--The artist's model must be able to sit or stand in one position in front of one or many artists for long periods of time. Therefore, physical stamina is very important.

Advantages and Disadvantages--There is no usual line of advancement in the modeling profession. It is a rarity, indeed, for the artist's model to advance to a higher position. However, the better art schools and the more successful artists pay higher hourly wages to an experienced model.

There are limited employment possibilities for men in the modeling field. Many men model occasionally in order to supplement an income which is obtained from another source.

TECHNICAL WRITER

The technical writer understands the language of the scientist or technician and has the ability to interpret it clearly and accurately for interested readers who are not scientists or technicians.

The technical writer prepares service manuals or handbooks, sales literature, research proposals and reports, contract specifications, and research abstracts. He also writes publicity releases, catalogs, and brochures.

The technical writer must know his subject before he can prepare the material. He begins by learning as much as he can about the subject. He studies reports, journals, notes, engineering drawings, and any other material which is available. He consults with draftsmen, engineers, scientists, technicians, production supervisors, and other workers who may be familiar with the product or process about which he is going to write.

After he has gathered and organized the information he needs, he prepares a first draft. He may ask representatives of the group for whom the document is being written to read the initial draft.

He may prepare or rewrite several drafts of the manuscript, depending upon the complexity of the subject and the audience for whom the material is being prepared.

History and Future--Technical writing is one of the newer, more professional career fields. It is expected that the present shortage of qualified technical writers will continue for some time. Thus, employment opportunities for both men and women are most favorable, particularly for those with exceptional writing abilities. Numerous opportunities exist in this field for women as well as men.

Work Environment--Technical writers work the usual five day, forty hour week in offices that are quiet and conducive to the kind of concentration required.

The technical writer works at a desk or typewriter to prepare his copy. Often he must visit other departments in the plant to observe processes, to consult with workers, or to participate in other information-collecting activities.

Training and Education--A bachelor's degree is a minimum requirement.

In high school, the student should pursue the regular preparatory program, including English, social studies, science, and mathematics.

Qualifications--The writer must be accurate and logical in his reporting and fit his style to the type of document he is preparing. Conforming to such technical accuracy and precision can stifle creative or imaginitive characteristics, but this type of writer must precisely interpret the messages of others and not his own. In this regard, his work differs greatly from other types of communication.

Advantages and Disadvantages--Sometimes the technical writer has to work under pressure which can result in some physical or mental strain. However, workers are not subject to undue physical strain or health hazards. Their vacations and benefits are the same as those of other employees in their organization.

COPYWRITER

The copywriter takes the ideas submitted to him by account executives and, using psychology, writes descriptive copy in the form of headlines, jingles, slogans, and other techniques designed to attract the attention of potential buyers. Some products are made to appeal to special people such as housewives, businessmen, or sportsmen. They are advertised through different media (radio, television, newspaper, billboards). The copywriter, in addition to being able to write, must know something about people and various advertising media. He also writes advertising material describing products such as automobiles or electric appliances, as well as for particular industries such as television.

History and Future--There are good employment opportunities for young people well qualified either through aptitude or by experience.

The copywrite industry will experience moderate growth during the next decade because of the new products created by science and technology, competition among existing industries, competition from new industries, and a continuing population growth. Increasing popularity of the self-service sales technique means that producers of goods will have to increase their advertising efforts so that customers will select their products from among others.

Work Environment--A normal forty hour week can be expected but may include evening and weekend work when necessary.

Copywriters most frequently work under great pressure in order to meet deadlines.

Training and Education--Most agencies employing beginning copywriters prefer college graduates with majors in journalism. A good knowledge in English is a necessity, also a variety of literature and social studies courses.

Qualifications--Emphasis is placed on the copywriter's ability to use language, both spoken and written. The ability to work with ideas is essential since the purpose of the copywriter is to sway the public to the point of buying.

Advantages and Disadvantages--Those who are not well qualified or prepared for agency work will find the writing field increasingly difficult to enter. This will also be true for those who seek work outside of agencies or in various other advertising services or organizations.

Usually, copywriters find their work a constant challenge to their initiative, imagination, and creative abilities.

MAGAZINE EDITORIAL WORKERS

The magazine editor must be able to combine creative and executive duties. Some editors spend much of their time in actual editorial work, revising and correcting articles, arranging material, selecting illustrations, and planning layouts. Other editors leave most of the work to their assistants and devote their own time to general supervision, policy determination, and administrative duties, including personnel management.

On large publications one or more assistant editors may work with the editor on each issue. They may also direct the editorial work in special departments of the magazine, such as fiction, homemaking, fashion, sports, or news.

Editorial assistants usually answer letters, interview callers, do the first reading of free-lance articles, and do library research to check facts used in articles.

Copyreaders check finished work for length, style, grammar, spelling, punctuation, organization, accuracy, and readability.

History and Future--A high rate of competition for beginning jobs has long been the rule in magazine editorial work. This is expected to continue, but the situation eases to some extent on the upper job levels. Well-qualified editorial workers are usually in demand.

Work Environment--Editorial workers are under tension much of the time with deadline pressure. Working overtime and on weekends and holidays is sometimes necessary.

Training and Education--A person interested in a career as an editorial worker should begin planning in high school. He should get a good background in English, literature, foreign language, science, and the social studies. Courses in composition, journalism, and shorthand would also be helpful.

Qualifications--The editorial worker must know the elements of good writing, including grammar, spelling, and punctuation. He should be able to express himself clearly, effectively, and easily.

Adaptability and the ability to work quickly, accurately, and efficiently under pressure are essential.

Advantages and Disadvantages--Editing offers more opportunities to women than do many other vocations. In the total printing, publishing, and allied industries women hold about twenty-eight percent of the jobs. In the editorial field itself the percentage is probably much higher, since women hold many jobs at all levels.

Advancement opportunities in the editorial field are generally very good. Since experience counts a great deal, promotions within the staff are usual.

THEATER MANAGER

The theater manager's duties can be divided into two categories: customer relations and business management. The comfort, entertainment, and safety of patrons fall into the category of customer relations. They are the manager's first concern.

It is up to the manager to see that lighting, heating, and cooling systems are working properly, that the theater and its restrooms are clean, and that refreshment stands are adequately stocked.

The manager is responsible for the safety of his patrons or guests. He has to make sure that state and local fire prevention laws and ordinances are strictly observed.

The second most important function of a theater manager is business management. He is responsible for hiring and paying employees, advertising, and maintenance of the building and equipment.

History and Future--Theater, the presentation of drama, was one of the first forms of entertainment that mankind invented.

Increasing opportunity for theater management, training, and advancement should develop as a result of the trend toward ownership of theaters by very large regional and national circuits. Whatever develops in television and other kinds of home entertainment, people will still enjoy going out to the theater, so demand for this type of entertainment is likely to increase. Capable managers will always be needed to make the theaters inviting.

Work Environment--Theater managers regularly work evenings and weekends, when theater attendance is heaviest.

If there is a breakdown in equipment, a theater manager may have to spend many hours at the theater before show time. If the doorman or cashier is ill, the manager may have to take over his job or find a replacement. In fact, any emergency is likely to involve the manager, who has the responsibility for keeping the theater in operation.

Training and Education--There are no particular educational requirements for the prospective theater manager, although the manager should have at least a high school education. High school courses in English, bookkeeping, typing, and public speaking are important. Extra curricular activities that aid in personality development, such as drama, debating, and student government, are also recommended.

Qualifications--A theater manager should have sales ability, good business sense, imagination, and an attractive personality. He must be able to get along with people, film distributors or producers, customers, unions, local business and community leaders, and his own employees.

Advantages and Disadvantages--The great majority of theater managers and employees are men, although women are employed as cashiers, refreshment counter clerks, and sometimes as ushers.

Promotion from within is common in the industry for employees who show promising qualities of ingenuity, efficiency, and courtesy. They have the opportunity to advance to superior of a number of theaters for a company or to film buyer or advertising director.

Singers may work under many different kinds of circumstances. The concert or opera singer may prepare for one performance for many weeks or many months. When the performance is over, he may start preparing for another or he may not have an engagement for a long period of time. Concert artists often tour the country and sometimes tour abroad. They usually travel with a staff which arranges the small but necessary details which make any concert successful.

Many concert artists are opera stars. They may give concerts when they are not scheduled to appear in an opera or when the opera season is over.

History and Future--Singing is the earliest form of musical expression. Much of it was chanting, which still is heard, but the tonal qualities were quite different from those which are commonly heard today.

Beginning a career as a singer has always been a difficult undertaking. It is no different now. It is a highly competitive field, attractive to many persons. Many try; few succeed. However, success is always possible for the person who is willing to strive to achieve it.

Work Environment--The concert artist may work under a wide variety of circumstances. He may be given a star's dressing room or share a mirror in the basement of a theater. He may work under the hot camera lights of motion pictures or television or tour in subzero temperatures. He may work amid the noise and confusion of a large rehearsal of a broadway show or in the relative peace and quiet of a small recording studio. Seldom are two days just alike.

Training and Education--There are no formal educational requirements, but a knowledge of foreign languages, especially Italian, French or German, will be helpful to both the concert and opera singer. Clear enunciation in all languages, including English, is important.

Qualifications--The concert artist must possess real dedication to the art of singing.

Persistence and perseverance are other important qualities for the artist. He must have perseverance to continue to practice day after day and to devote many hours to hard self-discipline.

Advantages and Disadvantages--The famous opera and concert stars who earn as much as $1,000 for a single performance may not have as many performances during a year. Although the income for what appears to be only a few hours work may seem attractive, the annual income may not be so impressive.

The artists must remember that their productive years may be few and that the income which is earned during the period of their public acclaim may have to serve them for life.

DANCERS

A dancer performs dances alone or with a group of persons. Moving rhythmically, usually to music, dancers can project an infinite range of emotions, ideas, and visual effects. Dancers often wear costumes which help to set the desired mood.

There are four basic types of dancing and most dancers specialize in one. Acrobatic dancers perform dances requiring difficult gymnastic feats; ballet dancers perform artistic dances suggesting a theme or story. Interpretive dancers (modern) interpret moods or characterizations. They utilize facial expressions and the body to express the dance theme. Tap dancers tap thythms with their feet.

History and Future--Dancing has served different functions and has taken on many styles through the years, but it has always been the liveliest of the arts. In ancient Egypt and Greece, it was a form of worship. Rome added the pantomime to the dance and gave it a social function. Social dancing began in the Middle Ages and continues to be enjoyed today in almost every land.

Keen competition and irregular employment will continue to characterize dancing as a career. However, the number of civic and community dance groups is increasing, and more professional dance companies are developing in cities throughout the United States. There will also be more opportunities for employment in television.

The employment outlook will be best for those who qualify as dance teachers.

Work Environment--Workweeks for dancers vary. A performance week has light performance and twelve rehearsal hours. Performers get overtime pay when required to work beyond the specified work hours.

Training and Education--Training involves many years of private lessons and attendance at a private dance school or college.

In high school the student should take any courses in dancing that are offered. Other high school courses should include English, social studies, mathematics, science, and history.

Qualifications--A dancer doesn't need to be a great beauty or unusually handsome, but a well formed body with good muscular control is important. Good feet and normal arches are required. Physical grace is also required.

Advantages and Disadvantages--Advancement in the dance field is not always toward stardom as a performer. Many dancers who have become teachers have received more pay and prestige than they did when performing. They often start instructing in schools where they have studied and become known. Sometimes they save enough money to open their own schools.

RELIGIOUS VOCATIONS
(LAYMEN)

There are many positions for laymen who wish to work professionally in religious activities without becoming ordained. Most of these positions require special religious or secular training.

The director of Christian education has a variety of duties within a local congregation. He is responsible for planning the entire teaching program for both youths and adults.

The educational associate for special groups works in a large parish, setting up and guiding activities of a particular age group in study, worship, and recreation. He also organizes and assists the volunteer workers.

Lay workers in campus ministry assist the campus chaplain with all program activities.

History and Future--There is a great demand for qualified religious staff members. Two of the greatest needs are in religious education and social service, where the demand for qualified people far exceeds the supply of those who hold jobs with only partial training. Qualified people with degrees of skill and education are needed for church related work all over the world.

Work Environment--Some religious workers serve as chaplains in the armed forces, on college campuses, or at hospitals or prisons. Others become professors or teachers in universities, seminaries, or colleges.

Training and Education--Training for religious occupations may take from a year beyond high school for some lay work to ten or more years for some form of the ministry.

A college degree is a necessity for the professional jobs.

Qualifications--The religious worker needs a real dedication to religious values, a profound belief in the worth of the work he does, and faith in the doctrine taught by his own church body. A deep interest in other people should include sensitivity to and respect for individual differences.

Advantages and Disadvantages--Church work encompasses a variety of occupations. Any young person, man or woman, whose religious faith, convictions, and ideals inspire him to serve his God, his church, and his fellow man through his employment can almost certainly find a religious vocation suited to his interests, aptitudes, qualifications, and training.

College trained people, especially those with advanced degrees, command greater salaries, but religious workers are nearly always paid less than similar personnel in other areas such as industry or government.

The clergyman has the responsibility of carrying out church rituals (forms of worship), explaining religious beliefs, and leading the followers in the practice of their religion.

As the leader of worship, the clergyman conducts public services, offers prayers, and leads devotions at church society meetings.

As teachers of the faith, the clergyman usually prepares and delivers one or two sermons on the Sabbath. He also addresses various church groups.

The clergyman is also "pastor of his flock." During the week he may spend considerable time visiting the people of his parish. When newcomers arrive in the neighborhood, he calls on them and welcomes them to the community. He officiates at baptisms, weddings, and funerals. He counsels his members on their problems.

The clergyman is also the leader of his congregation. He directs church affairs and coordinates the activities of various groups (Sunday school, young people's groups, and so forth). Committee meetings take up a good deal of his time. He is vitally interested in the education of his young members in religious and social service work and teaches them by participating in classes, clubs, group and individual discussion, and recreational activities. Such activities help the pastor to know his church members better.

The clergyman also participates in church administration, the overall direction of the local church and denomination at large. He attends many regional and national meetings, assists in determining church policy and doctrines, and supervises much of the local church office work.

As the representative of the church, the clergyman often takes part in community activities, especially those that concern his parishioners' spiritual and social welfare and their cultural development.

History and Future--Today there is a severe shortage of clergymen. The shortages are expected to continue. The biggest church expansion will be in cities and suburbs. There will also be expanding opportunities for clergymen in television and radio work, youth and family relations, labor-management relations, and ministries to people on the move, such as vacationers in national parks. Clergymen will be needed for counseling students at colleges and universities.

Training and Education--A bachelor's degree or its equivalent is usually necessary for gaining admittance to an accredited theological seminary (a school where clergymen are trained). During college one should acquire a broad background in liberal arts. Courses in English, philosophy, history, and the natural and social sciences are especially helpful.

Qualifications--The effective clergyman is sensitive to people and their problems; curious about life; possessed of a deep sense of responsibility that drives him at all times beyond the limits of duty; willing and able to stand by his convictions but with the humility to yield if necessary; courteous and tactful; and emotionally stable. He communicates to others a cheerful and optimistic outlook and avoids self-importance. He is able to speak well. To withstand the physical demands of the work, the clergyman should be healthy.

Advantages and Disadvantages--Income for clergymen is often higher in large cities and in prosperous surburban areas.

In many cases clergymen are furnished with free housing and utilities. In addition, many clergymen receive retirement pensions and paid vacations of two to six weeks.

A clergyman seldom keeps regular office hours; he is on call at all hours of the day or night to anyone needing his counsel and guidance.

INTERPRETER AND TRANSLATOR

The interpreter translates the spoken passages of a foreign language into another specific language. He may be designated according to the language interpreted, such as French interpreter or Spanish interpreter.

The interpreter is able to convert to a second language a spoken sentence which still is being completed in the first language. The interpreter is able to comprehend the speaker's intention for the conclusion of the sentence from the way in which it is phrased and from the context in which it is placed. He knows something of the speaking habits of the person whose speech he is interpreting and thus is able to anticipate the way in which the sentence will be completed. He may also make judgments about the intent of the sentence or phrase from the speaker's gestures, facial expressions, and inflections.

History and Future--From the time when men who spoke different languages found it necessary to communicate with each other, there have been interpreters.

Diplomats and high level government officials have always employed persons who might serve as interpreters. However, the need was not so pressing that such persons were required to spend many of their working hours performing the service.

Persons who are good linguists are greatly needed to work as interpreters.

It is estimated that the demand for interpreters will increase as more international conferences are held. The outlook for competent persons is excellent. However, great skills are needed. There is little demand for mediocrity.

Work Environment--Interpreters work under a wide variety of circumstances and conditions. Conference interpreters probably have the most adequate facilities in which to work. Their glass-enclosed booths are well lighted and temperature controlled. Buildings in which international conferences are held are usually attractive and comfortable.

Interpreters who work in escort services are often required to travel for long periods of time. Their day begins and ends with that of the group or persons for whom they are interpreting.

Training and Education--Employers prefer interpreters who have achieved college and graduate degrees in the field in which they are to interpret.

A high school student interested in a career as an interpreter should enroll in a college preparatory course. A thorough knowledge of one's own language is a good basis for building an understanding of another language.

Qualifications--The interpreter must be poised. He should not become excited or exasperated under trying circumstances and should be able to concentrate in the midst of confusion. In other words, he must possess the temperament which is necessary for a job as an interpreter.

Advantages and Disadvantages--Competency in language determines the speed of advancement for interpreters. Job opportunities and promotions into positions of responsibility are plentiful for those who have acquired great proficiency in languages.

However, there is no time when an interpreter can feel that his skills are adequate. His is a career which takes constant work and study. Persons who are successful recognize this fact and maintain an interest in keeping abreast of current happenings in the countries in which their languages are spoken. Although many persons do not realize it, language changes constantly. Names for new inventions, machines, or processes are constantly being added to a language. A person who does not keep up with language changes will find his communication skills have become outdated and he will sound stilted and old-fashioned.

(NOTE: The translator must possess the same qualities as the interpreter. The only difference is that the translator deals with written words.)

ANTHROPOLOGIST

There are two main divisions of anthropology, the cultural and the physical. Cultural anthropology deals with man's behavior, both past and present, as well as with the beliefs people hold in relation to religion, language, economics, and political organizations. Cultural anthropologists often work with smaller, less complex and more easily understood societies.

Physical anthropologists are concerned with the biology of human groups. They study the differences between the members of past and present human societies and are particularly interested in the geographical distribution of human physical characteristics.

History and Future--Anthropology dates back to Aristotle. It is a commonly accepted fact that it became an established science during the Victorian Era or the era of exploration. Anthropology developed rather slowly until the 1930's when the use of applied anthropological research began to be stressed by a number of governments.

It is anticipated that there will be a great demand for anthropologists, especially those who have their Ph.D. degrees. Those with lesser degrees will face competition for professional positions. However, many of the less qualified people will enter related fields of work, such as public administration and areas demanding professional personnel with a broad background.

Work Environment--The majority of anthropologists are employed by colleges and universities and have satisfactory working conditions. The physical facilities in which they work are normally clean, well-lighted, and ventilated.

Anthropologists usually work about forty hours per week although the hours may not be regular.

Training and Education--High school students planning to enter anthropology should take courses in foreign languages, English composition and literature, mathematics, history, and geography, as well as in the natural sciences.

The high school graduate should be prepared for a long training period beyond high school, about four years of work beyond the bachelor's degree.

Qualifications--The anthropologist should demonstrate a keen interest in biology, history, and geography and should have the ability to learn foreign languages easily. He should also gain pleasure from visiting museums and from viewing collections of ancient artifacts.

Advantages and Disadvantages--There are a number of rewards inherent in the work, including job security and the major satisfaction one gains from working in an area he truly enjoys. There is satisfaction in knowing that the work of the anthropologist is helping to create a better life for everyone through a better understanding of humanity, past and present.

ARCHAEOLOGIST

An archaeologist is a student of man's past whose primary interest lies not in the interpretation of documents recorded by man, but in the examination of artifacts (structures and objects) made and used by man in all ages. These artifacts permit the archaeologist to study man's material products and to reconstruct, with a degree of accuracy, the culture of the people. Through cultural associations, the archaeologist may infer the economic, political, social, and intellectual development of man.

History and Future--Archaeology began in 1948 with the discovery of the city of Pompeii which had been buried for centuries under volcanic ash.

Archaeology has come a long way since the discovery of Pompeii. Today, aerial photography locates buried sites that at one time would have taken men years to find. Ingenious methods have been worked out to learn the approximate time that objects thousands of years old were made.

There will continue to be jobs for qualified people, but candidates will have to be both very talented and highly motivated. Most openings will be for archaeologists trained as anthropologists.

Work Environment--The archaeologist whose major interest is field archaeology will spend much of his time at excavation sites. He will be away from home for long periods of time, often at irregular intervals. He will spend many hours each day digging, sifting dirt and debris, and cleaning various artifacts. This work is done slowly and painstakingly, often in hot, uncomfortable surroundings. Work hours for the field archaeologist are long, for evenings are spent examining and classifying the results of the day's diggings or in writing reports.

The archaeologist engaged in museum work will have the benefit of a routine workday. Often, he will assist in preparing collections for public exhibition, conduct lectures, and pursue research.

Many archaeologists agree that the intellectual rewards of work in this field, whether it be field archaeology or museum work, are far more meaningful and satisfying than the monetary rewards.

Training and Education--A Ph.D. degree is highly desirable for a person who intends to pursue a full-time career in archaeology. There are some jobs available for those with only a master's degree, which takes two to three years beyond the bachelor's degree. Many people get a master's degree and then take a job while they complete work on a doctorate.

Training for a career in archaeology should begin in high school. It is important for the student to have a good background in English, since the archaeologist must be able to speak and write well. Courses in typing and bookkeeping are also valuable tools.

Other valuable high school subjects are history, geometry, trigonometry, mechanical and freehand drawing, and general science courses.

The high school student should also read a lot about archaeology in general, as well as the field he intends to specialize in. He should visit and study the collections of nearby museums. It would be a good idea for him to talk over his career plans with an archaeologist at a university or museum. He should also get some camping experience.

Qualifications--The archaeologist is physically tough enough to stand the hardships of field work. He has a scientific mind and enjoys searching out facts. He has a good memory for details. He is also extremely patient and accurate. Above all, he is dedicated to his profession.

Advantages and Disadvantages--Archaeologists holding a doctor's degree will have the best opportunities for employment. Graduates with only a master's degree will face heavy competition for professional positions in archaeology.

Health

Due to the rising population and greater individual emphasis on obtaining health protection and health care, there is a tremendous need for more health workers to provide adequate service and facilities to maintain a high level of health for our citizens.

PSYCHIATRIST

The psychiatrist is not a "soul healer"; he or she is a medical doctor, who, through additional years of training and experience, has become a specialist in the diagnosis, treatment, and prevention of mental disorders.

Many psychiatrists are in private practice. Some may combine private practice with part-time teaching, hospital or clinic work, or consultation in community mental health agencies.

Many psychiatrists work with other specialists such as psychologists, psychiatric nurses, social workers, and physical and recreational therapists.

History and Future--Philippe Pinel, an eighteenth century French doctor, is credited with making the first significant efforts toward bringing the treatment out of the realm of witchcraft and demonology. For a long time mental diseases were thought of as something evil until the end of the nineteenth century when modern psychiatry began.

There is a demand for psychiatrists both in private practice and in institutional work. The high income for psychiatrists helps compensate for the years and money spent in education and training.

Work Environment--Many psychiatrists are in private practice; some combine private practice with part-time teaching, hospital or clinic work, or consultation in community mental health agencies.

Training and Education--A psychiatrist's formal education is long and difficult. He or she needs a broad educational background in social science, humanities, and natural science. After high school, he needs four years of college, then a period of major training: four years in an approved medical school.

The psychiatrist will spend an additional three or four years in a variety of hospital and outpatient settings.

Qualifications--The psychiatrist must be able to gain the trust and faith of his patients and must share the most intimate and personal lives without becoming emotionally involved.

Advantages and Disadvantages--It costs a psychiatrist less than other doctors to get started in practice since he does not require as much expensive equipment. Also, his yearly overhead expense is considerably smaller.

It takes, as a student, about fourteen years after leaving high school before one can become certified as a psychiatrist.

PSYCHOLOGIST

A psychologist is interested in behavior (the way people act). Basically, he or she wants to learn about people and about the principles that underlie the way they respond to events.

Many psychologists work in various social, institutional, and industrial settings, such as schools, welfare agencies, hospitals, colleges, clinics, and private industries. The psychologist may be a teacher, but he may also conduct research and provide services as part of his regular activities.

History and Future--The psychologist's work has changed some over the last fifty years. There is as much emphasis placed on the psychologist's advisory role as on his diagnosis and treatment of mental and emotional disorders.

The field of psychology, especially school psychology, is relatively new and growing rapidly offering exciting possibilities for young people who want to help children, who enjoy working with people, and who are curious about the causes of human behavior.

Work Environment--The psychologist may teach or conduct research, serve as consultant to other professional persons, administer programs, and participate in the diagnosis and treatment of emotional disorders.

Training and Education--Preparation for a career includes studies in biological and social sciences, some specialized psychology courses, and one or two years of course work beyond the bachelor's at the master's level. Earning the doctorate demands a high level of academic achievement and may require a research project that makes an original contribution to the field of psychology.

Qualifications--The psychologist must be mature, well adjusted, poised, and must like to work with people.

Advantages and Disadvantages--The pay is very good as salaries range upward according to experience. Many can supplement earnings with private practice.

Admission to graduate programs is highly competitive. Enrollment is limited in order to insure high quality in the preparation of students.

PSYCHOMETRIST

A psychometrist is a person who gives tests and makes surveys. These tests and surveys attempt to measure intelligence, reading ability, achievement, personality, interests, or aptitude.

Although psychometrists may serve in a variety of positions, they are usually employed in schools. The psychometrist who works in a large school system may spend almost all his time giving tests to students.

Before a psychometrist knows what use to make of test results, he or she must know how to interpret them. This means he must have information about how people in general answer the test questions he is using.

History and Future--More than fifty years ago the psychometrist gathered data by observing the difference in behavior among individuals. Now it has developed into a highly technical area using psychology and math.

The psychometrist has a bright future. There is much demand for people who can handle psychology and math.

Work Environment--The psychometrist works in industry, government, or schools. He works more with facts, such as information about people, rather than with people themselves.

Training and Education--The psychometrist must have a good knowledge of math. The psychometrist must also have an educational and psychological background that will enable him to look beyond a test score and take other important factors into consideration before he reaches a decision about any person. He must have a master's degree.

Qualifications--A person in this position should like mathematics and enjoy solving problems.

Advantages and Disadvantages--Opportunities in the field of psychometrics are plentiful. The field has considerable overlap with other specialities. Some psychologists may well be considered psychometrists for their time spent developing tests and application blanks for selecting or training employees.

MEDICAL TECHNOLOGIST

Medical technologists perform numerous laboratory tests. Some of the tests are simple; others are not. The tests contribute to the detection, diagnosis, treatment, and study of diseases.

Most of the medical technologists work under the direction of a clinical pathologist (a doctor's doctor and a medical detective).

Most medical technologists are employed in metropolitan areas where the concentration of hospitals and other institutions with medical laboratories is highest.

Between eighty and ninety percent of medical technologists are women. The number of men in the profession is growing, however, especially with the new opportunities opening up in laboratory management.

History and Future--Technologists have been assisting physicians since the fourteenth century. It was not until the 1890's that medical laboratories were formally established in the United States.

Laboratory techniques are constantly changing; new ones are being developed almost daily. Consequently, requirements for employment in this field are climbing and a trend is toward a five year preparation.

There is a demand for more medical technologists.

Work Environment--About two-thirds of all medical technologists work in hospital laboratories. Others work in clinics, with doctors in private practice, and in medical, dental, and veterinary colleges.

Medical technologists work eight hours a day and forty hours a week. Those employed by hospitals, where emergency duty is often required, may be on call one night a week or one week a month.

Training and Education--Graduation from high school is necessary to begin formal preparation for a career in medical technology. Biology, chemistry, physics, mathematics, and typing are very helpful in preparing for medical technology. Three years of undergraduate work and one year of clinical training are required to become a certified technologist.

Qualifications--One should possess certain qualities of personality and character. A genuine concern for the welfare of people, precision and accuracy in their work, patience and calmness, the ability to work efficiently under pressure, and the willingness to check and recheck details are all essential characteristics in becoming a qualified medical technologist.

Advantages and Disadvantages--Opportunities for advancement are good for the capable and conscientious medical technologist who keeps up with new developments in the profession. Medical technologists have the opportunity for promotion to supervisor of a department in the medical laboratory of a large hospital or, eventually, to become supervisor of the entire laboratory.

Medical technologists who work weekends or nights may receive overtime pay.

Medical technology does have an occupational hazard of infection from bacteria or viruses, though such an illness occurs rarely. If disease is contracted, carelessness is usually the cause.

MEDICAL ASSISTANT

The medical assistant usually sets up appointments for patients, keeps the waiting room in order, greets patients as they enter, and answers questions. She or he keeps all record cards up to date, sends out bills, and makes simple laboratory tests. Sometimes the medical assistant has to keep the doctor's financial records up to date.

History and Future- Witnin the last thirty years, the job of the medical assistant has been recognized as a distinct vocation for which special training is necessary. The employment opportunities for medical assistants in the future are good.

Work Environment--Medical assistants work a forty hour week. Some work on Saturdays or during evenings.

The hospitals, offices, and clinics are generally clean, pleasant places in which to work. Usually the offices are air-conditioned and convenient to transportation.

Training and Education--High school graduation and some office training are requirements for the medical assistant. He or she must have pertinent courses in science from high school such as biology, chemistry, physiology, and hygiene.

Qualifications--The medical assistant must have an especially pleasing, sympathetic personality as well as a genuine interest in and a liking for people. Poise is an essential requirement.

Advantages and Disadvantages--The medical assistant has a steady year-round job, usually in pleasant surroundings. The work is interesting.

Oftentimes the medical assistant meets people under conditions of stress and tension.

VETERINARY LABORATORY TECHNICIAN

The veterinary laboratory technician is responsible for the health and welfare of the animals. He must provide food and water, clean housing, ample exercise, and must observe the changing health status of the animals.

The technician must know as much as possible about the animal's habits, including feeding, nesting and breeding activities, and its natural habitat.

The technician's duties are to give animals injections, take samples of body fluids, and observe reactions to experiments.

History and Future--Animals have contributed so much to man's benefit and enjoyment, so it is only natural that man wants to conserve this valuable resource. The field of animal care has grown very large in scope over the years. Veterinary technicians are essential to maintain the interdependence of man and animals.

The increased interest in breeding and laboratory science points to a bright future of many opportunities for animal care workers.

Work Environment--They work in medical schools, research centers, animal hospitals, and commerical breeding houses for experimental animals directed by a Ph.D., an M.D., or a veterinarian.

Training and Education--The technician must be twenty years of age in order to apply for certification. Technicians must be high school graduates. Other requirements include three years of experience, a course in animal technology, and the successful completion of a written, oral, and practical examination.

Qualifications--One must have a love for animals and an understanding and appreciation of the use of animals for experimental purposes. Working with animals in 4-H clubs and similar organizations can offer valuable experience in developing qualifications for laboratory technicians.

Advantages and Disadvantages--Earnings differ considerably depending on the type of job and the size of the organization. Benefits may include free tuition for advanced education or free housing.

Many animals have a distinct odor that may be unpleasant until one becomes accustomed to it. However, a veterinary technician must accept the environment of the animals.

DENTAL ASSISTANT

The dental assistant performs duties which relieve the dentist from clerical and minor routine tasks. The dental assistant may stand on her feet a great deal of the working day. She readies the dental chair for patients and arranges the dental equipment, instruments, and supplies which the dentist may use. Dental assistants may also act as an office manager, private secretary, receptionist, and bookkeeper.

History and Future--This occupation is relatively new. The first dental assistant is known to have been employed near the end of the nineteenth century. There are today an estimated 115,000 dental assistants in this country. Opportunities appear to be excellent although competition for these jobs is keen.

Work Environment--The dental assistant may work at top speed some of the working day and at a normal or slow pace at other periods. She may be subject to irritable or uneasy adults and to children who may be fearful, noisy, or ill-tempered.

Training and Education--Some dentists prefer to hire high school graduates or those with some college background and to train them on the job. Some assistants may attend a one or two year program in dental assisting.

Qualifications--These include a pleasing personality, the ability to get along with all kinds of people, a neat appearance, a well modulated voice, some manual dexterity, courteousness, and tactfulness. The assistant should be able to take supervision graciously and to accept responsibility.

Advantages and Disadvantages--The dental assistant works in an environment to meet many interesting people. He or she has regular hours and can count on steady employment.

There is a lack of promotional opportunities and the difficulty of working with frightened and complaining patients.

The assistant may also be on his or her feet most of the day.

DENTAL TECHNICIAN

The dental technician starts with the model of a mouth impression and the written directions supplied by the dentist. He then completes all the processes necessary to make a set of teeth. He or she selects the teeth by color, size, and shape and gives the finishing touches of polishing and grinding the dentures to insure exact fit and comfortable smoothness.

The dental technician also makes and repairs partial dentures and other replacements, such as crowns and bridges. All the work is done according to a dentist's carefully detailed prescription.

History and Future--There is no record of exactly when commercial laboratories came into being, but it is known that in 1830 a dental supply house in London specialized in making dental plates for dentists.

The first dental supply was opened in the United States in 1887 by Dr. W. H. Stowe, a practicing dentist.

It is expected that more dental laboratory technicians will be needed in the future. The dental laboratory technician is practically exempted from the affects of automation because no two of his assignments are alike. Each one demands careful handwork and individual attention.

Work Environment--The dental technician works in hospitals, dental offices, or commercial establishments. The area where he is working should be clean, orderly, well ventilated, and well lighted.

Training and Education--A high school diploma or its equivalent, one or two years in an educational institution that offers dental laboratory training, one year of supervised on-the-job training, and three years of practical experience are required in his specialty. At the end of this five or six year period of training and experience, he must pass a written and practical examination.

Qualifications--The dental technician must have a great deal of patience, accuracy, and a certain amount of artistic ability. He or she must have a high degree of manual and finger dexterity, good eyesight, and color vision. Speech, hearing, or lower limb handicaps need not deter a person from preparing for this type of job if it appeals to him.

Advantages and Disadvantages--Knowledgeable men in the field forecast excellent opportunities for dental technicians because there is no fear of automation. Better job opportunities are concentrated in larger cities.

DENTAL HYGIENIST

The dental hygienist works directly in the mouth of the patient and, aside from the dentist, is the only dental helper that is licensed to do so.

The dental hygienist's work includes scaling and polishing the teeth, examining and charting dental defects, giving instructions in home care of the teeth, and completing routine office business procedures.

History and Future--Dental hygiene is a relatively new occupation. It was orgainzed in 1913 mainly through the efforts of Dr. Alfred Jones.

The Bureau of Labor statistics estimates that an average of 2,400 job openings will occur annually through 1980.

Work Environment--Dental hygienists are usually employed in clean, well lighted offices. The nature of the work requires long hours of standing.

Training and Education--High school subjects generally required for the prospective dental hygiene student are mathematics, biology, chemistry, and English. Before becoming licensed or permitted to practice, a dental hygienist must have a minimum of two years of college level education at one of the special schools of dental hygiene.

Qualifications--The hygienist should enjoy working with the public. Good grooming and good health are also important.

Advantages and Disadvantages--Working conditions are pleasant, and contact with many kinds of people makes the job a constant challenge.

Opportunities for advancement are somewhat limited without additional education. However, opportunities for careers outside private dental practice increase with additional education.

NURSING AIDE

The aide performs duties and tasks assigned by and performed under the supervision of a registered nurse. She or he assists in the personal care of ill or disabled persons and in the maintenance of a safe and healthful environment. The nursing aide may be assigned jobs such as answering patients' signals and seeing that the nurse is made aware of the patients' situation. Some nursing aides may assist with the weighing, feeding, and bathing of patients.

History and Future--The nursing profession has always needed nursing aides to assist professional nurses. Opportunities for employment in hospitals are excellent. More than 60,000 new openings are expected each year. Many of these openings will be in hospitals, but jobs will also be available in nursing homes, old age retirement homes, and similar institutions.

Work Environment--The nursing aide may be employed in almost every phase of hospital work from the gift shop to the recovery room.

Since a hospital involves services on a twenty-four hour a day basis, the aide may be expected to work an evening or night tour. Most hospital evening tours are from 3:00 p.m. to 11:30 p.m.; night tours are from 11:30 p.m. to 7:30 a.m. The usual workweek is from thirty-five to forty hours.

Training and Education--After graduation aides may be trained on the job for a period ranging from two weeks to three months with some classroom instruction.

Qualifications--An aide must enjoy dealing with a variety of people and situations. Good grooming, speech, personal hygiene, and physical and mental health are requirements for working in a hospital or other health facilities.

Advantages and Disadvantages--The aide receives salary during training and often day-care centers provide care for young children of married students.

RECEPTIONIST

The receptionist is a hostess who may give the caller his first impression of an entire organization.

Probably no two receptionist's jobs are alike. Their duties are determined by the nature of the business that employs them.

In a hospital, the receptionist has a variety of duties. She or he directs visitors to proper floors, checks patients' discharge slips before they leave, and records the date and hour of the discharge in addition to the number of days the patient was hospitalized.

In a doctor's or dentist's office, the receptionist's most important duty is to keep appointments straight. She usually answers the telephone, sends out bills, and, if she has been trained, assists the doctor.

History and Future--According to the Bureau of Labor statistics, in early 1967 there were 250,000 receptionists employed in the United States.

The Bureau of Labor statistics predicts a rapid increase in the number of receptionists. More than 25,000 workers will be needed each year, since employers are rapidly becoming convinced of the public relations value of a good receptionist.

Work Environment--The medical receptionist works in hospitals, clinics, health insurance offices, and medical schools. The receptionist's hours are usually thirty-five to forty a week although she may work some evenings, if the doctor has office hours then, and take time off during the day.

Training and Education--Most employers demand that a beginning receptionist have at least completed high school. Receptionists in physicians' offices may need some special training so that they can assist the doctor in his work, if necessary. This type of training can be learned on the job.

Qualifications--The receptionist's biggest asset is her personality. She must have a friendly, calm, poised manner and the emotional stability that will enable her to be as courteous and gracious to the last caller of the day as she was to the first.

Advantages and Disadvantages--A receptionist has the pleasure of meeting different people. Offices are often attractively decorated.

The fact that job requirements are relatively low means that a receptionist can be replaced rather easily and, therefore, lack job security.

X-RAY CLERK

The duties of an X-ray clerk generally include making X-ray exposures and helping the radiologist in fluoroscopy (observing the inside of an object by using X-rays).

The X-ray clerk also may be called upon to do the clerical work involved such as keeping records of the patients and the films. The clerk is also responsible for the mental and physical comfort of the patient while in his care.

History and Future--The increasing important contribution of X-rays to the medical field established the qualified X-ray clerk firmly in his employment situation. He or she is not subject to the insecurity that threatens many vocations.

Work Environment--X-ray technicians work forty to forty-four hours per week. Compensation for overtime in the case of emergencies is usually in time off duty rather than in increased pay. The environment is usually clean and the clerk must wear a uniform.

Training and Education--The candidate must be a high school graduate or the equivalent. Mathematics and science courses are helpful in preparation for a career as an X-ray clerk.

Qualifications--Applicants between the ages of eighteen to thirty years of age are generally preferred. Candidates must be in good health. Applicants should show a wiliingness to work with the sick and disabled and to be accurate, thorough, and sympathetic.

Advantages and Disadvantages--The X-ray clerk profession provides contact with highly trained, pleasant, and intelligent co-workers. The training period is relatively short. There are opportunities for travel both in the United States and abroad.

The X-ray clerk, like other paramedical workers, is occasionally in contact with patients having contagious or communicable diseases; however, with modern precautionary techniques there is little likelihood of contracting these diseases.

SCHOOL NURSE

The school nurse works with the principal, teachers, and other school personnel in identifying and meeting social, emotional, and physical needs of school children. She or he examines children and keeps their health records.

The school nurse teaches classes in subjects such as child care, first aid, and home nursing and establishes nursing policies to meet emergencies. The school nurse also administers immunizations and maintains health records of students.

History and Future--Nursing was first considered a profession during the 1860's when Florence Nightingale, during the Crimean War, showed the value of good nursing care. Thousands of additional nurses are needed in the schools today. This expansion is due to the population growth in the schools and many social changes. Approximately one percent of all nurses are men, but gradually more are responding to the expanding opportunities for men nurses.

Work Environment--The school nurse works in public or private schools with children, teachers, administrators, other school personnel, and parents. A workweek is generally five days totaling thirty-five to forty hours.

Training and Education--High school graduation with competence in science and math is a must. A bachelor of science degree with a major in nursing is required for a school nurse.

Qualifications--The school nurse must have good physical health, emotional maturity, sound judgment, dependability, initiative, and a sense of responsibility.

Advantages and Disadvantages--A nursing background can lead to other career fields such as administrators, supervisors, instructors, and consultants for a drug company. Additional education and training adds to the nurse's advancement opportunities and income.

The school nurse has to work with injured and crying children.

SANITARIAN

The sanitarian is a specialist in environmental health. The sanitarian has many jobs that help protect us. He or she examines food plants and water supplies. He may get a sample of food or water and have it tested. He acts as a consultant to industries such as beef packing plants. He gives health education programs to teach people about better health habits. He may make suggestions on ways to avoid pollution.

The professional sanitarian may be assisted by a sanitarian technician. The technician takes samples for testing and often performs the required test.

History and Future--Only thirty-one universities and colleges offered undergraduate programs in environmental health in 1968. Employment of sanitarians is expected to increase very rapidly through the 1970's as state and local health agencies expand their activities in the field of environmental health.

Work Environment--Sanitarians come in contact with unpleasant physical surroundings such as sewage disposal facilities and slum housing.

Sanitarians are employed in just about every state and about half are employed in ten states: California, Florida, Illinois, Indiana, New York, Ohio, Pennsylvania, Texas, Virginia, and Wisconsin.

Training and Education--A bachelor's degree in environmental health is the preferred preparation for a beginning job as a professional sanitarian. Beginning sanitarians usually start at the trainee level where they remain up to a year receiving on-the-job training in environmental health practice. They also learn to evaluate conditions and to recommend corrective action.

Qualifications--Sanitarians must have the ability to get along well with people, as it is often necessary to be tactful in securing the correction of unsanitary conditions. Sanitarians should be able to speak effectively before civic groups or in court.

Advantages and Disadvantages--High level positions usually require a graduate degree in some aspect of public health. In some cases, sanitarian technicians having two years of college and work experience can advance to professional sanitarian positions. However, rising hiring standards are restricting the entrance to professional positions for those without a bachelor's degree.

PUBLIC HEALTH EDUCATOR

A health educator is hired to keep the public informed about their community health conditions and how they can be improved. To do this, a health educator must do a variety of tasks. He or she plans programs for television and radio. The educator gathers a list of people who are willing to talk to groups about health topics. He also plans training programs for the area and helps people solve their own health problems.

History and Future--Research in health care is rising; therefore, health educators are needed to keep the public informed.

Work Environment--Health educators work with news reporters and other professional speakers in health education.

Training and Education--A four year college graduate is preferred with a good background in English, science, and health education in addition to training in human relations and photography.

Qualifications--The health educator must be interested in working with the public in general. He or she must have a pleasing personality and appearance.

Advantages and Disadvantages--A health educator will have frequent opportunities to meet and work with other interesting people but the most important advantage is the personal satisfaction of helping others improve their health.

Hospitality and Recreation

Hospitality includes every occupation which aids individuals or groups in making the actual plans for a vacation and/or tour and involves all transportation personnel who have contact with the passenger or tourist. Recreation includes all personnel who enable the tourist to be entertained and/or amused. Many hospitality and recreation occupations that were once part-time and somewhat insignificant have become full-time, indispensable tasks.

TRAVEL AGENCY WORKERS

Agencies vary in size, from big operations employing many people who perform various jobs to small agencies in which one person conducts all the business.

The information clerk gives information about train, ship, and plane schedules; fares; hotel accommodations and rates; and tours, cruises, and sightseeing trips.

The travel consultant helps tourists plan sightseeing itineraries and plans the amount of money the tourist needs on a trip.

The clerk types the itinerary and keeps the books in order.

The department head supervises the employees of the travel agency.

History and Future--The travel agency is a relatively new business. The first agency in the United States was founded in New York City in 1872 by Thomas Cook and Sons, a company that now has offices all over the world.

The outlook for travel agencies is very good. Travel is the third largest business in the United States. More than seventy-five percent of all international air travel is handled by North American travel agents.

Work Environment--Most agents work a forty hour week, although this frequently includes working a half day on Saturday or an occasional evening. During rush times of the year (from January through June) overtime may be necessary. Agents may receive additional salary from this work or be given compensatory time off.

The agent usually works in pleasant physical surroundings, designed to prove attractive to his clients.

Training and Education--Most travel agencies require their workers to have a high school education and many prefer those with one year or more of college. Some positions, such as manager or owner of an agency, call for a college degree in business or even a master's degree.

In high school the student can best prepare for a job as a travel agency worker by taking courses in history, geography, mathematics, public speaking, literature, and English. Knowledge of at least one foreign language is essential in some agency jobs. Typing and shorthand will help the beginner enter the field as a secretary or a general office clerk.

Qualifications--Travel agents are in constant contact with the public. Thus, they must be able to get along well with people. A good agent must be patient, courteous, and able to convey a personal interest in the travel plans and problems of his client. He should also have a liking for such details as studying timetables, computing tax charges, and marking maps.

Advantages and Disadvantages--The travel agency worker deals most frequently with people who are happy and enthusiastic about their travel plans and are, therefore, pleasant to work with. There are, however, some clients who are difficult to please and who change their minds quite often. This situation can be very frustrating for the agent.

During economic recessions the travel business is one of the first to feel the pinch. Travel for pleasure is one of the first luxuries to be forsaken, and even business trips are usually greatly curtailed.

TICKET AND RESERVATION AGENT

The reservation agent makes flight reservations for customers and gives out flight schedules and fare information. Records are made of the reservations taken, and those are teletyped to clerks in other cities to avoid selling the same flight space twice.

The agent also gives information on flight schedules, fares, arrivals, and departures. He weighs and checks in baggage, charging fees for overweight.

History and Future--The employment outlook for reservation agents is very good.

Work Environment--Agents work a five day, forty hour week, including some night, weekend, and holiday shifts. During rush periods, overtime may be required. Work surroundings are usually pleasant and comfortable. The work is not considered physically strenuous; however, agents must lift baggage from weighing scales to pulley belts and must stand most of the time on duty.

Training and Education--A high school education is required, and many airlines require new employees to complete a training program.

Qualifications--A neat appearance, tact, and a clear speaking voice are essential.

Advantages and Disadvantages--The agents must wear a uniform, but the airlines will give a uniform allowance or arrange for it to be bought at discount rates. Reduced rates on air travel are usually given to agents and their immediate families during the off season.

PUBLIC RELATIONS WORKER

Public relations workers provide information about an employer's business to newspapers, magazines, radio, television, and other channels of communication. They plan the kind of publicity that will be most effective, contact the people who may be interested in using it, and prepare and assemble the necessary materials.

Public relations workers may arrange speaking engagements for company officials and write the speeches they deliver. Often they participate in community affairs, serving as an employer's representative during safety campaigns and other community projects. Showing a film at a school assembly, staging a beauty contest, calling a press conference, and planning a convention may all be part of a public relations worker's job.

History and Future--The demand for public relations workers is expected to grow as population increases and the general level of business activity rises. In recent years, there has been an increase in the amount of funds spent on public relations and many organizations have newly developed public relations departments. This trend is expected to continue in the years ahead.

Work Environment--The workweek for public relations workers usually is thirty-five to forty hours. Irregular hours and overtime often may be necessary. On occasion, the nature of their regular assignments or special events requires that public relations workers be on call around the clock.

Training and Education--A college education generally is regarded as the best preparation for public relations work. Some employers seek graduates who have majors in English, journalism, or public relations; others prefer candidates with a background in science or some other field related to the firm's business activities.

Qualifications--Creativity, initiative, drive, and the ability to express thoughts clearly and simply are the most important personal qualifications for the public relations worker.

Advantages and Disadvantages--For the public relations workers who develop special talents, particularly in the field of financial relations, the salaries and opportunities are excellent.

Public relations may require long and irregular hours. Sometimes extensive travel is necessary. Public relations may be a somewhat insecure career, since clients may curtail programs or decide to develop an internal public relations operation, although the work today is more stable than it was ten or twenty years ago.

STEWARD

Stewards are employed mainly to take care of the passengers in terms of comfort and safety. They check in for work about an hour before flight time so they can pick up the passenger list and join the flight crew for a briefing.

The steward stands at the door of the plane, ready to greet each passenger as he arrives. At the same time, he may have to check each ticket against the flight list. When all passengers have boarded the plane and the door is closed for takeoff, the steward issues a general welcome to the passengers over the plane's intercom. He then gives instructions for use of the aircraft's emergency equipment.

During the flight, the steward makes certain that seat belts are fastened when necessary and gives additional safety instructions when required. He answers passengers' questions about the flight and weather conditions.

The steward also has record keeping duties. He must report on all minor medications given to passengers and list all lost and found articles.

At the end of the flight he stands at the door and bids all passengers a friendly goodbye. His final duty is to fill out a flight report. Then he heads for home.

History and Future--The total number of stewards and stewardesses is expected to grow, resulting from increases in passenger traffic and the use of larger planes.

However, competition is stiff. Out of the thousands of young people who apply for jobs each year, only a small percentage meet the airline's standards of intelligence and personality.

Work Environment--Stewards may work nights, holidays, and weekends. Their flying time is usually limited to seventy-five hours a month. They may spend as many as thirty-five hours a month on ground duties.

Almost all the stewards work solely on overseas flights, although domestic airlines are training more men now.

Training and Education--The minimum educational requirement is graduation from high school. Some airlines require at least two years of college or the equivalent in training and education.

Qualifications--Applicants must be at least nineteen years old, five feet two inches to six feet tall with weight in proportion to height. They must have excellent health, a pleasant speaking voice, and good vision.

Advantages and Disadvantages--Stewards have opportunities to travel and meet interesting people, sometimes celebrities. Generous vacation time, sick leave, and other fringe benefits usually go with the job.

One looking for glamor in this occupation may be disappointed if glamor is thought to mean an easy job. The work is hard in some respects. A flight attendant handles heavy trays and serves full-course meals or snacks under conditions not always easy.

PROFESSIONAL ATHLETE (FOOTBALL)

A professional athlete is one who participates in competitive athletic events for pay. The amateur athlete receives no pay whatsoever. Once an athlete has gained professional status, he can no longer compete as an amateur.

History and Future--Up to the middle of the nineteenth century, hunting, fishing, and horse racing were the chief sports in the United States. Between 1850 and 1900 many new forms of athletics came into being and formal rules for playing were adopted. College football began in 1869.

There are always openings for beginning but well qualified players. The competition for these, however, is extremely keen.

Work Environment--Players report to training camps about mid-July, approximately two months in advance of the regular playing season. For the first few weeks they have physical workouts twice daily along with classroom sessions morning, noon, and night. As training progresses, physical workouts are limited to one a day and include scrimmages and much heavy contact.

Training and Education--Ninety-eight percent of professional football players are former college players. About the only way a non-collegian can make it in professional football is to play in either the military service or in minor league football, but this is rare because it is difficult for a non-collegian to compete even at these levels.

Qualifications--Outstanding health and physical fitness are a must. Motivation is essential. A player cannot compete successfully unless he is motivated to do so. He must like the game well enough to withstand its rigors and must want to win within the scope of the rules of the game.

Advantages and Disadvantages--The professional football player is respected and treated as a celebrity. Great players can earn high incomes from team salaries, percentages of winnings from league championships, and endorsements for various types of products. Those with college training can often capitalize on their names as sports stars in entering business after their playing days are over.

There is a chance of permanent physical injury. Competition is keen to stay on a major league team. While earnings are high, they are made only during a small portion of one's working life. There are usually critical adjustments to be made once the days of cheers and headlines are over and the challenge of making a living becomes more routine.

PHYSICAL EDUCATION TEACHER

Physical education teachers work to make people physically fit, good citizens, and capable leaders.

The physical education teacher may choose to teach in an elementary or secondary school or to become a supervisor or director of physical education. The teacher may continue his education and become a college teacher or research specialist.

The physical education teacher may also teach children with special problems, such as the physically handicapped, the underprivileged, or the mentally retarded.

History and Future--Physical education in the United States began to take shape shortly after the Civil War. Industry grew rapidly and the use of mechanical power began to spread. Modern technology reduced the physical activity that always has been a part of a person's daily work. The workday and workweek were shortened. Therefore, organized physical education became a part of the regular school program.

At the present time, there is an acute shortage of women teachers. Opportunities for both men and women in the elementary grades are expected to increase as physical fitness programs expand. Opportunities in junior colleges as well as four year colleges will grow as enrollments continue to swell and new colleges are established.

Work Environment--Hours and duties of the physical education teacher vary with the job, as do the conditions under which he works. In northern climates much of the fall activity is outdoors in brisk weather. In southern regions the activity may be outdoors in the warm sun. Otherwise, the teacher usually works in a well-ventilated, well-lighted gymnasium.

Training and Education--High school students interested in a career in physical education should take courses in mathematics, science, and English. They should also take part in as many leadership activities and sports as possible, including intramurals, athletic associations, and summer recreation activities.

Completion of a full four year college program leading to a bachelor's degree is required for teaching almost anywhere in the United States.

Qualifications--The physical education teacher must be able to communicate with students of all levels of intelligence and from all kinds of backgrounds.

A pleasing personality and appearance, a good sence of humor, good character, integrity, maturity, emotional stability, and the desire and ability to lead young people are important to success.

Advantages and Disadvantages--Physical education is a rewarding, healthful, and invigorating career with strong appeal to the many young men and women who like sports, the outdoors, and who enjoy youth work.

The work is strenuous. The teacher should be able to undergo long periods of physical activity and expect to work longer than the average eight hour day.

Usually a physical education teacher receives extra compensation for performing extra duties.

CAMP COUNSELOR

The camp counselor is mainly concerned with the mental, emotional, and physical well-being of the campers in their cabins or tents. The counselors help their campers participate in the scheduled activities. During unscheduled time they help campers keep cabins neat and assist them with basic living skills, such as general cleanliness and appropriate grooming and dress.

The day-camp counselor helps the child make a successful transfer to activities away from school and home in a natural, informal learning situation.

The day-camp counselor is concerned mainly with enabling the child to use and enjoy the benefits of outdoor recreation and elementary camping skills. In some cases day camping is a preparation for overnight and resident camping.

History and Future-In 1862, Fredrick William Gunn, a private schoolmaster in New England, organized the first school camp when he took his students on a two week camping trip to Long Island Sound in New Haven, Connecticut.

Opportunities for professional careers in the camping field itself are on the increase and the future looks bright both for summer counselors and for those who want a career in camp work.

Work Environment-Some camps are quiet and small, serving as few as twenty to twenty-five campers; others might accommodate 500 or 600 campers at a time. Some are overnight camps. In others, campers may stay from one to four weeks or even for the whole summer. The average day camp is operated on a day to day basis with campers on the site from six to eight hours each day. Day camps might be operated one or two days a week.

Training and Education-Young men and women who are eighteen years of age and have had one year of college can qualify for camp counselors. Some camps hire junior counselors to help with various activities.

Qualifications-The counselor must be emotionally mature enough to treat each person in his group fairly. A counselor must enjoy the outdoors and be alert to the beauty and wonder of nature. There is no place in counseling for the overly squeamish person who shudders at the sight of a snake or a beetle or for the fair weather counselor who goes to pieces in the face of rain.

Advantages and Disadvantages-A competent counselor might rise to the position of unit head, supervising the activities of other counselors. After several years of camp experience as a unit head, he can become a head counselor.

Experience in one camp qualifies a counselor for positions in other camps, provided he can secure a favorable reference from the director for whom he has worked.

COMMUNITY SERVICE DIRECTOR

The community service director is a generalist, relating education to all phases of community organization and development. He is responsible for coordinating and programming activities that are centered in the school. The director uses the school as the basis of operation in providing a program for all ages in vocational training and participation. His objective is to improve skills as well as to offer new and broad experiences toward the general improvement of the individual participants.

History and Future--Unlike many career fields that face near extinction because of man's progress in technology, recreation offers extensive opportunities now and in the future. As people's incomes rise and their leisure time increases, the demand for recreational resources and facilities grow.

The demand for skilled recreation workers is expected to rise in the future because of the increase in leisure time and the growing emphasis on recreation programs in the many areas cited.

Work Environment--Some directors work for neighborhood organizations or for government agencies. Some work in modern office buildings. Others have offices in community centers or ghetto store fronts.

Training and Education--Young men and women who want to become community directors should obtain a college degree in sociology or psychology.

Qualifications--A pleasant personality, neat appearance, and a good speaking voice are essential. The director should have strong leadership qualities and should enjoy working with others. The director should also be able to accept responsibility and to exercise judgment.

Advantages and Disadvantages--Most community directors start out as assistants or specialists. From there they advance to playground, playfield, or recreation center directors and then to superintendent of recreation activities. The top position is superintendent of recreation and parks.

GROUND KEEPER

The ground keeper takes care of gardens, shrubbery, and trees.

The ground keeper uses mechanical equipment such as cultivators, edgers, lawn sweepers, electric pruners and clippers, and power mowers and sprayers. He makes minor repairs and services this equipment regularly so that it is kept in good operating condition. He also uses tools such as spades, trowels, rakes, hoes, shears, weeders, diggers, bulb planters, and seeders. A modern ground keeper may help in the adaption and installation of an underground irrigation system for the area he takes care of. More elaborate systems are automatically controlled from an electronic console, with which the ground keeper must become familiar.

History and Future--Landscaping services are taking over much of the maintenance work and are providing good job opportunities for ground keepers. As a result of the increased amounts of leisure time, people will make greater demands on public facilities. As a result, employers will need larger staffs than ever before.

Work Environment--The ground keeper's workweek may run from forty-four to forty-eight hours, including Saturday during the busier seasons. The men try to use all the daylight hours to advantage. Some jobs, particularly during the planting and growing seasons, may require unusual working hours. This could mean starting the working day at sunrise or working a split shift--some hours in the early morning, the remainder in the late afternoon or early evening. If bad weather interferes with the planting schedule, some overtime may be required.

Most ground keeping is done outdoors and must be pursued in many kinds of weather. The four or five winter months are not very busy in climates that have freezing temperatures, and sometimes assistants and laborers are laid off for part of the winter. Golf courses, however, usually retain at least some of the crew through the winter so that equipment can be overhauled during the slack season.

Training and Education--Many employers are not at all concerned about formal education for their gardeners; they are satisfied with employees who have an ability to read and write English. As in most work, however, additional education gives the applicant an advantage over those having only a minimum education. Biology, especially botany, and vocational agriculture are good high school courses to take. Courses at a botanical garden or agricultural college will also prove worthwhile.

Qualifications--Good physical health is necessary.

Ground keeping work is for people who like to be outdoors and not tied down to a strict routine. He must have a love for plants and flowers and for working in the soil with his hands.

Advantages and Disadvantages--Although the work requires reaching, bending, stooping, kneeling, lifting, and walking, it is seldom strenuous. It is not considered dangerous; however, it is not entirely without hazards. Insecticides can be harmful if not handled with caution. Injuries can be incurred by anyone working with machinery and tools, particularly if he is careless.

Government jobs that come under civil service offer stability and security not always available in other gardening employment. In some areas this work is unionized, with employees belonging to the International Brotherhood of Teamsters.

RETAIL FLORIST

All florist shops have certain functions in common. The owner must be a good buyer and a good merchandiser. The function of buying is very important. Flowers are perishable, so the owner must know how many flowers to buy and when to buy them.

The florist sets up window displays or oversees this work. He plans advertising and sales promotion, hires and supervises employees, and administers the business in general.

History and Future--The outlook for the florist industry is good at present, and economists predict it will continue.

Automation presents little threat to floral designers, florist shop managers, and sales persons.

Work Environment--Sometimes the florist will spend twelve to fourteen hours a day in his shop during holiday seasons when other people are relaxing. He may also have slack seasons.

Training and Education--In high school the prospective retail florist should take courses in bookkeeping, business English, retailing, art, and design.

Qualifications--Sensitivity to beauty is important to the florist. He must be able to select flowers that are in good taste for each occasion and to arrange them with an artistic sense of form and color.

The florist needs creative ability and finger dexterity to make floral arrangements.

Advantages and Disadvantages--Floral occupations provide an outlet for persons with artistic talent, creative ability, and business sense. As a business, it can be started with a relatively small amount of capital. It can also be run as a family business.

There is a certain amount of risk, since the business faces heavy competition, the problems of perishable stock, and the changeable preferences of the public. It takes many years to build a business.

GIFT SHOP OWNER

The most important job of the gift shop owner or manager is the selection of merchandise. Owners of large shops go on periodic buying trips to merchandise centers or even abroad to choose the exact items they want.

When the merchandise is delivered, the owner decides how it should be arranged in the store.

Record keeping, finances, and planning are all the responsibility of the shop owner. The owner also has the responsibility of doing the day-by-day bookkeeping and clerical work, buying advertising, deciding when to have special sales, and planning other attention-getting events.

The owner must keep careful track of the inventory. The owner must at all times be aware of what is in stock, what is moving and must be recorded, what is out of stock, and what items are not selling. If something is not selling and is taking up important space in the shop, he might want to put it on a special sale table.

History and Future--The future of the gift shop business depends on the general economic situation of the nation.

Success for the individual shop depends on the owner's business talent, her adaptability in giving personal service to each customer, and her skill in selecting desirable and salable merchandise.

Work Environment--Gift shops are usually open six days a week and one or more evenings, but in some locations, as in resort towns or on a highway, the shop may be open even on Sundays and holidays from morning to night.

The gift shop business tends to be seasonal with Easter, Christmas, and June the busy periods. Birthdays, anniversaries, and other individual events, however, keep things moving at a moderate pace throughout the year.

Training and Education--The gift shop owner should at least have completed high school. Many of those in the business have a college education.

High school courses that will be helpful are English, art retailing, salesmanship, business management, bookkeeping, business accounting, economics, typing, and psychology. Special courses in flower arrangement, principles of interior decoration, or the study of antiques would also be helpful, depending on the type of shop.

Qualifications--For dealing with the public, the gift shop owner should have personal qualifications such as friendliness, patience, tact, a pleasant manner, and an outgoing personality. The gift shop owner must be industrious and willing to work long hours, perhaps for a small income, especially when getting started.

Advantages and Disadvantages--Owning a business enables a person to do the kind of work that he prefers and to control his own working conditions. While some gift shop owners earn little more than expenses, others may net what is generally considered to be a high salary.

Manufacturing

Manufacturing is the activity around which our national economy revolves. From factories flow the goods that have provided a standard of living unmatched elsewhere in the world. The products of the manufacturing industries range in complexity from a simple plastic toy to an intricate electronic computer and in size from miniature electronic components to gigantic nuclear powered aircraft carriers. It is expected that by 1980, well over twenty million people will be employed in manufacturing industries. By far this is the greatest number of people in any area of work.

PERSONNEL DIRECTOR (MANUFACTURING)

The first job of the personnel director is to find people to fill available jobs at nearly all levels. He advertises, recruits, or uses agencies to find applicants. Then he carefully interviews them to make sure they fit the job.

If problems arise in the company, the personnel department assists department heads in handling employee complaints and grievances. It also may train supervisors in the handling of employees and their problems. In some companies the personnel director is in charge of dealing with unions and of handling contract negotiations as the company representative.

History and Future--Fifty years ago a company probably had never heard of the term personnel director for this is a field that has developed along with the growth of business.

Expansion of employment in personnel work is expected during the next few years as the nation's employment rises. Job opportunities for college graduates with specialized training in the field will be greater than those for young people seeking advancement into personnel work from production, clerical, or other sub-professional jobs.

Work Environment--Personnel workers generally work in comfortable office surroundings. The hours are fairly regular, between thirty-five and forty a week, but the personnel worker must be flexible enough to cope with emergencies that might call for overtime work.

Training and Education--A college degree is necessary for entrance into personnel work. In certain specialities and in the top level of personnel administration, a master's or a doctor's degree is considered essential.

The personnel worker should have a good background in social and behavioral sciences, especially sociology, psychology, and social psychology. Courses in business and economics are also important for understanding the company and its policies.

Qualifications--The personnel worker must understand why people behave as they do in certain situations and what will make them good or bad employees in certain positions.

Advantages and Disadvantages--Generally, personnel workers receive the same benefits as the other employees in the organizations where they work. These benefits include paid vacations, insurance, hospitalization, and retirement programs.

Personnel workers may put in time after working hours studying or attending professional conferences.

SALESMAN (MANUFACTURING)

The manufacturer's salesman tries to use the best technique possible for selling his product. After he has made the sale, it is his responsibility to keep the customer satisfied with the product and with the company selling it. He keeps customers informed about new products and new uses of established products. He advises them of price changes. He often suggests to his employer methods of advertising and promoting a product and then helps set up attractive product displays.

Most manufacturer's salesmen spend a good deal of time traveling. Often this is done during the evening after a full day's work calling on customers. The customers may vary from other manufacturers to railroads, banks, wholesalers, and sometimes retailers.

History and Future--As more and more products are marketed, a growing number of salesmen will be needed to explain their benefits to the public. The increasing complexity of many products will boost the need for highly trained salesmen.

Work Environment--A manufacturer's salesman works within a given territory. This territory can vary from a few blocks in a large city to several states.

The salesman almost always uses an automobile for transportation, although occasionally those working in small city territories find it more convenient to walk.

Although most of their time is spent making calls, these salesmen devote several hours a day to paperwork. Much of the paperwork can be done in the office at the start or end of the day, but some has to be done at home in the evening or over weekends.

Training and Education--In high school a student can start preparing for a sales career by taking courses in English, math, and social studies. A speaking and reading knowledge of one or more foreign languages gives you a special advantage of selling.

Qualifications--A salesman must have a friendly personality, one that puts people at ease. He must also be honest and have enough energy to meet the demanding work schedule. A well-groomed appearance is a must.

Advantages and Disadvantages--A salesman with a good sales record and proven leadership ability can be promoted to higher level jobs, such as sales supervisor or branch manager. Many top executive positions in industry are filled by men who have had successful sales careers.

Selling is hard work and requires conscientious and diligent effort.

CHEMICAL OPERATOR (MANUFACTURING WORKER)

The chemical operator is responsible for the safe and economic operation of chemical equipment, as well as for the quality and quantity of the product. In order to turn out a product that meets exacting specifications, he must follow instructions carefully. In accordance with these instructions, the operators regulate the amounts of materials to be used. They set and adjust the controls for temperature, pressure, and flow of materials. To check the quality of the procedure, the operators use measuring and testing instruments and keep records and reports of each stage of the operation. They may be aided in their work by one or more helpers or assistants.

History and Future--The chemical industry started in the New World in 1635 when John Winthrop, Jr. opened a small plant in Boston. Winthrop's plant produced chemicals used to process gunpowder and leather. The development of synthetic plastics and fibers in the 1920's helped to boost commercial chemical activity. Both world wars also created an increased demand for chemical products.

Chemical operators will continue to be one of the largest occupational groups in the industry.

Work Environment--Most industrial chemical plants operate twenty-four hours a day seven days a week, and production workers usually work on rotating shifts that include night and weekend work.

Many workers are given two weeks vacation after one year of employment, three weeks after five years, four weeks after ten years, and five weeks after twenty years.

Training and Education--High school graduation is the usual educational background required for chemical operators. High school courses in science and mathematics may prove valuable.

Qualifications--Mechanical aptitude and good eyesight are essential. Chemical operators must also be alert in order to quickly spot mechanical failures.

Advantages and Disadvantages--The industrial chemical industry offers workers high wages, very good job security, and liberal fringe benefits. Employees who are willing to accept responsibility will find ample opportunity to work their way up in their jobs because most plants prefer to promote from within their own staffs rather than to seek experienced workers elsewhere.

INSPECTOR (MANUFACTURING)

Almost everything manufactured must be carefully inspected during the manufacturing process. Mass-produced items must be tested and inspected to make sure they operate properly. The workers who see that the size and quality of raw materials, parts, assemblers, and finished products meet specifications are known as inspectors.

Inspectors use a variety of methods in order to be certain that the products they examine conform to specifications. They may merely look for scratches and other defects in products or parts or they may use gages, micrometers, and other measuring devices to check the accuracy of the parts.

Inspectors often keep records of the number of parts they have accepted and rejected. When they find a large number of faulty pieces, they notify their supervisors so that corrections can be made on the production line. Some inspectors use hand tools, such as screwdrivers or pliers, in their work. In some industries, inspectors may make minor repairs and adjustments and grade products for quality.

History and Future--In early 1968, about one-half of all inspectors were women. Many of these women were employed in the metalworking industries, especially in plants that produce small electrical and electronic components.

The electrical machinery industry is expected to increase overall employment. However, the growing complexity of the products manufactured should also result in a need for more inspectors.

Work Environment--Some inspectors may work in well-lighted, air-conditioned work places in an aircraft or missile plant; others, who may work on the production floor of a machinery or metal fabricating plant, often are exposed to high temperatures, oil, grease, and noise.

Training and Education--Employers select inspectors by giving a test to determine their ability to work with numbers. Employers also look for employees who can do work requiring constant attention. Employers may hire applicants who do not have a high school diploma if they have qualifying aptitude tests or related job experience.

Qualifications--Many employers look for applicants who have good health and eyesight, can follow directions, and are dependable.

Advantages and Disadvantages--Most of the manufacturing plants employing inspectors provide for fringe benefits, such as paid holidays and vacations, health insurance, life insurance, and a retirement pension.

METALLURGICAL ENGINEER (MANUFACTURING)

The metallurgical engineer is responsible for extracting metals from ores, smelting and refining them, and making them into the myriad products of our technological world.

The extractive metallurgist deals with the separation of metals from their ores and with their refinement. Some gold, copper, a little silver, mercury, and bismuth are found as metals, but all the others exist naturally in a nonmetallic compound state and have to be separated from the worthless material in which they are found.

History and Future--Metallurgy is an immense and growing field, offering many opportunities for the engineer. The profession of metallurgical engineering is worthy of consideration by anyone with a scientific turn of mind.

Work Environment--Metallurgists may be employed by mining companies or by plants that produce automobiles, aircraft, agricultural equipment, ships, or other steel products, big or little. They may work for electrical and public service companies, designing and constructing machinery for generating heat and power.

Most metallurgists work and live in the large industrial centers of New York, New Jersey, Pennsylvania, Ohio, Illinois, Michigan, and California.

Training and Education--A college preparatory program in high school is best with concentration in math, science, and English. The second step is a bachelor's degree. In view of the wide scope of the activities of metallurgical engineers, it is not surprising that they have graduated as chemists, physicists, and chemical engineers. Basic courses in math, chemistry, physics, mechanics, and English are characteristics of the whole college program.

Qualifications--An interest in and aptitude for math and science are necessary. Mechanical ability, curiosity, and a desire to study and work out intricate problems are good traits to have. Ingenuity, resourcefulness, and patience are also important qualifications.

Advantages and Disadvantages--There is a constant need for trained personnel in metallurgy. Although 800 engineers are graduated every year, the industry can use four times that number.

There is really no limit for the metallurgist. The combination of good formal education, native ability, addiction to continued study, and varied experience will unlock almost any door for a metallurgist.

ELECTRICAL ENGINEER

Electrical engineers design, develop, and supervise the manufacture of electrical and electronic equipment. This includes communications equipment, electronic apparatus such as television, radar, computers, and missile guidance systems, and electrical appliances of all kinds. They also design and participate in the operation of facilities for generating and distributing electrical power.

Electrical engineers usually specialize in a major area of work such as electronics, electrical equipment manufacturing, communications, or power. Many specialize in sub-divisions of these broad areas; for example, electrical engineers may specialize in computers or in missile guidance and tracking systems.

History and Future--Each year the demand for well qualified electrical engineers greatly exceeds the supply. This shortage is expected to continue through the 1970's. Besides the growth brought about by our population expansion, the engineering field is growing in scope and complexity, requiring alert, perceptive, and well-trained personnel.

Work Environment--The majority of electrical engineers work inside, using the most modern and efficient equipment available. The work is challenging, usually non-repetitive, and gives the opportunity for research and for using one's ingenuity. Employment in this career field is not usually of a seasonal nature.

Training and Education--The engineer aspirant should complete a high school college entrance program including physics, chemistry, mechanical drawing, and all the mathematics possible.

Qualifications--The engineer aspirant should be persistent, careful, painstaking, and thorough. Honesty, reliability, and willingness to work and study are all traits found in successful electrical engineers.

Advantages and Disadvantages--Electrical engineers receive two or three weeks vacation with pay, depending on their length of service, and from six to eight paid holidays a year. Almost all electronics workers are covered by health and life insurance plans; many are covered by pension plans and other fringe benefits.

ELECTRONICS TECHNICIAN (MANUFACTURING)

Electronics technicians are employed in many branches of technology and business.

One major specialty of an electronics technician is troubleshooting for a company that uses a complex computer system. He tests equipment that is not working properly, discovers the faulty parts, and repairs the computer.

The electronics technician who works in research may assist in the construction and testing of experimental models, such as lighting arresters, for research on ultra-high voltage power transmissions.

An electronics engineering technician helps design and make specialized test equipment. The duties of the electronics engineering technician include testing sophisticated circuitry, interpreting design concepts, working out practical production methods, and preparing reports on experimental projects.

History and Future--Electronics really came into its own after World War II. One important development was the increased office use of electronic data processing equipment. This revolutionized methods of record keeping. Computers have revolutionized not only business methods but also manufacturing processes.

Today, man is probing into space. Space is a vast and growing undertaking that requires thousands of electronics technicians. Truly, this is one career that has no ceiling on opportunity; the sky is no longer the limit.

The demand for electronics technicians is expected to increase through the 1980's, especially for graduates of technician training programs.

Work Environment--The electronics technician usually works a forty hour week. However, if he is responsible for equipment that must be kept in constant operation, sometimes he must be on call to make emergency repairs. Technicians in research projects may also have to work irregular hours. When more than one technician is available, overtime usually is rotated.

Training and Education--Courses in high school that will be useful to the electronics technician include algebra, geometry, trigonometry, and basic physics.

An applicant may wish to get his training for electronics technology at a college or university offering a specific program for technicians, or he may wish to study for a bachelor's degree in engineering technology.

Qualifications--Mathematical aptitude is important. Patience and the ability to pay careful attention to details are helpful qualities.

A willingness to keep up with new developments either by reading or by formal study is also essential, for the field changes quickly and knowledge is soon outdated.

Advantages and Disadvantages--Electronics offers qualified persons excellent opportunities for employment, and the industry is still growing rapidly. It is also a comparatively well-paying field, since the demand for trained technicians currently far exceeds the supply. Electronics technicians often are engaged in exciting work that is important to the welfare of the nation.

One disadvantage to the field of electronics technology is that the present high level of employment opportunity is dependent on a similar high level of expenditure for research and development.

UNIT ASSEMBLY-LINE TESTER

The unit assembly-line tester begins testing when raw materials enter the plants, and he continues throughout fabricating operations. Finished components and end products undergo thorough testing and inspection, frequently including periodical operation before shipment.

In end-product manufacturing plants, testers use voltmeters (an instrument for measuring in volts the differences of potentials between different points of an electrical circuit), oscilloscopes, and other test meters to make certain that components, subassemblies, and end products conform to specifications.

History and Future--Employment for assembly-line testers probably will rise at a slow rate because of the growing mechanization and automation of assembly line operation.

Work Environment--Plants are well lighted, clean, and quiet. Many plants are relatively new and are located in suburban and semirural areas. Most plant departments are air-conditioned where dust-free conditions or air temperature control is necessary.

Training and Education--Formal training in electronics usually is not necessary for assembly-line testers, but completion of high school frequently is required. Job applicants may have to pass aptitude tests and demonstrate skill for the tester's type of work. On-the-job training, usually for a short period, generally is provided for workers who have had no previous experience.

Qualifications--Testers need good vision, good color perception, manual dexterity, and patience.

Advantages and Disadvantages--Many assembly-line operations are repetitious. Music during working hours, cafeterias, recreational facilities, and social programs are provided for employees by some electronic manufacturing firms.

The frequency of injuries in electronics manufacturing is far below the average in manufacturing as a whole, and injuries are usually less severe.

INSTRUMENT MAKER (MANUFACTURING)

Instrument makers are specialists in a large field of workers. They are sometimes called modelmakers or experimental machinists, workers who apply their trade knowledge and skills to construct full-scale experimental working models of electronics or mechanical controls, tools, and machines. They may construct scale models for testing, display, or perhaps for molds or cost products. Generally, instrument makers work with engineers and scientists to develop new kinds of research, development, and testing instruments.

An instrument maker may be told exactly how to make the instrument, or he may have to work from sketchy notes. In this case, he may be responsible for the selection of materials to be used, method of construction, and setting of design specifications. Sometimes, instruments have never been made before, and in these situations the instrument maker may be free to solve design problems without outside guidance.

History and Future--The craft of instrument making came into being several centuries ago when experimental science began to develop.

Many early instruments were made by hand. Only in recent years have mass-production methods been applied to instrument making. In some branches of this industry, hand methods are still used to a large extent. This is especially true in the work of making instruments for research and development.

More sensitive and versatile instruments will have to be produced in the near future and as the need for these increases, so will the need for qualified instrument makers.

Work Environment--Instrument makers work a normal forty hour week. Union contracts provide benefits such as paid vacation, sick leave, profit sharing, pension, and life, health, and accident insurance. Most instrument manufacturing firms are located in or near large cities, such as New York, Chicago, Philadelphia, Boston, Los Angeles, Detroit, Buffalo, and Rochester, (N. Y.). Often they are located near universities, research centers, and government laboratories where research and development is performed.

Instrument makers work in laboratories or small specialized shops. Some work in research laboratories of universities. Others work in laboratories and shops of large corporations that mass produce instrumentation and control systems. Most instrument makers, however, work for small firms or for the government.

Training and Education--One who wants to become an instrument maker should take as many high school mathematics and science courses as possible, including physics, chemistry, algebra, geometry, and trigonometry. He should also take mechanical drawing and shop courses in advanced metal working and electronics.

Qualifications--The instrument maker must have good eyesight, steady hands, and mechanical aptitude for this occupation.

Advantages and Disadvantages--Instrument makers seldom face the tiring, monotonous assembly-line pressure. The field offers steady employment and regular hours to skilled employees.

Commonly used machines can be dangerous if not handled with care, and slivers of flying metal also pose a threat to the negligent worker. These problems, however, are easily controlled.

TOOL MAKER

The job of the tool maker is one of the most highly skilled and exacting careers in the metal machining field. The tools he makes are used by production and other metal machine workers in all industries.

He builds tools either to his own or a designer's specifications. He must be able to interpret and follow blueprints, rough sketches, or models; operate lathes, shapers, grinders, drill presses, and other metal working machines; and carry on all operations from choosing the proper metal stock to the hand finishing, inspecting, and testing of the complete tool.

The tool maker works closely with management executives in the installation of new tooling methods. He has an ideal background for problem-solving in this area.

History and Future--Several thousand beginners will be needed each year to replace those who retire or leave the trade for other reasons. Also, the constant expansion of the metal machinery industry and the technological changes which are occurring mean an increased need for these highly skilled workers.

Work Environment--The tool maker works with others, usually in orderly, well-lighted, and ventilated but noisy shops. Sometimes, because of the nearness to foundries, the working area may be hot, humid, and dusty.

He may work in a small screened-off section of a plant or in a room used by a number of tool makers. Although much of his work is done while standing, he may sit at a bench to do hand work. He frequently moves from one place to another to use different equipment and machines.

He uses his eyes continually for close work, such as reading blueprints and the fine calibrations on measuring devices.

Training and Education--High school graduation is usually required for entrance into this apprenticeship training program.

An aspirant might consider the following courses while in high school: machine shop, metal shop, mathematics (algebra, geometry, trigonometry), mechanical drawing, and physics.

Qualifications--The aspirant to a position of tool maker should be a high school graduate with a high average mental ability. He should have mechanical interest and aptitude and a liking for exacting detail work. He should have some mathematical ability, finger-hand dexterity, and good eye-hand coordination. He should have pride in his craftsmanship, be able to follow orders, and be able to work well with others.

Advantages and Disadvantages--The tool maker has one of the highest earnings in the skilled trades. His employment is steady. He would usually be the last one laid off in a period of recession, mainly because he could do many other jobs in a machine shop.

The training period is long. There is danger of injury from the high-speed cutting edges. The close tolerances to which he works could be nerve-wracking to some people.

MACHINIST (MANUFACTURING)

A skilled machinist working on a typical project usually performs the following steps. First, he carefully studies the blueprints, sketches, or other specifications his foreman has given him. He calculates the size of the workpieces he will need, what machine tools he will use, and in what order he will use them. Next, he sharpens his cutting tools and sets up the machine. This involves inserting and adjusting the cutting tools and setting up the speed and movement of the machine's holding device.

Many machinists are learning to operate and repair numerically controlled machines. Basically, these are machine tools that are controlled by instructions (number symbols) punched on a card or a tape. The card or tape is inserted into the machine. The machine then translates the numbers into various actions, such as cutting or drilling.

History and Future--Machine tools are a product of the Industrial Revolution that began little more than two hundred years ago. Before that time, everything man wore or used was handmade with tools that had changed little in basic design over the centuries.

During the 1950's machine tools changed drastically because of technological developments, such as numerical control of operations and widespread application of electronics.

The total number of machinists is expected to increase only slightly during the next few years. However, there will be thousands of job openings available because of the need to replace workers who retire, die, advance, and change over to another field.

Although automation is making some jobs obsolete, it is creating new positions for machinists who are capable of operating the complex electronic and computerized systems.

Work Environment--Machinists work seven to eight hours a day. Occasionally, they may put in overtime. Depending on the plant, afternoon or night shift work may be required. Most shops give their machinists paid vacations and other benefits.

Machine shops are clean and well lighted, and the work is not physically strenuous.

Training and Education--High school or vocational school graduates are preferred by most companies.

The machinist must know how to read blueprints, operate machine tools, and use measuring instruments and handtools. The machinist must know the working properties of all sorts of metals. He also has to be able to apply mathematics to shop problems and use the charts and tables supplied by manufacturers of metal and hardware.

Qualifications--Machinists need above-average intelligence, mechanical ability, patience, accuracy, and ingenuity. They also should have manual dexterity, good eyesight, and be able to stand for long periods of time.

Advantages and Disadvantages--The capable machinist may advance to different levels of machining, such as tool and die making or experimental machining. He may also advance to foreman, assistant superintendent, general superintendent, works manager, or he may consider the possibility of opening up his own shop.

Safety hazards are not numerous in machining. Among the hazards are flying metal chips, abrasive dust, sharp cutting tools, and high speed moving parts. The danger has been greatly reduced in recent years by requiring workers to use unbreakable goggles, protective shoes and other safety devices, and by requiring strict observance of safety rules. When accidents do occur, state workmen's compensation laws provide medical care and pay benefits for the resulting loss of working time.

FRAMEMAN (FRAME WIRER)

The frameman is usually the beginning job from which a worker may advance to a more skilled central office craft job. Much of the frameman's job involves running, connecting, and disconnecting wires according to plans prepared by line assigners.

History and Future--Many opportunities will result for new framemen from the need to replace workers who retire, die, or transfer to other jobs.

Work Environment--Framemen work in clean and well lighted surroundings. Generally, the frameman is covered by the same provisions governing overtime pay, vacations, holidays, and other benefits that apply to telephone workers.

Training and Education--Applicants must have a high school or vocational school education. Usually, beginning framemen work with experienced framemen under the direction of a supervisor or foreman.

Qualifications--An applicant must have manual dexterity, good eyesight, no color blindness, and an aptitude for mechanics and reading diagrams and blueprints. He should be able to work with others, for many times teamwork is essential to solve a complex problem.

Advantages and Disadvantages--A frameman can receive additional training within the company he is working. After additional training, he can move into the job of central office repairman or test boardman with a higher pay schedule.

ASSEMBLY-LINE BENCH WORKER

The assembler may sometimes feel like a very small cog in a very large wheel. However, his or her job is essential to the electronics industry. The nature and technical aspect of the end product lend themselves to assembly-line production, and it is important that each technical operation be perfect. Using small hand tools, each assembler is responsible for the exactness and quality of the work performed. Cutters, tweezers, pliers, soldering irons, and screwdrivers are among the tools used. Hand soldering and spot welding of tiny joints require a delicate touch. On some jobs the assemblers may work with a microscope. Assemblers sometimes check the results of their own work, then locate and correct errors.

Most of the assembly jobs held by women are with companies that manufacture end products, usually for consumer use, such as phonographs, stereo components, or television sets. These semi-skilled jobs are usually repetitive and require little or no knowledge of electronic theory.

History and Future--The assembly line has become the basic element around which most modern factories are designed.

Long-range plans of electronics manufacturers project a constant need for assemblers to staff new or expanding plants. The industry has provided excellent opportunities for women; these are expected to continue to grow over the next decade.

Work Environment--Assembly-line workers usually work five eight hour days or forty hours a week. Overtime is not very common, since most assembly operations are scheduled to conform with expected demands.

Most manufacturing plants are of modern design and are well lighted; the comfort of employees has been taken into consideration. Work areas are clean and often air-conditioned. Noise is kept to a minimum.

Training and Education--Courses in home economics, such as sewing, will increase finger dexterity. Typing courses serve the same purpose. Courses in mechanical drawing and blueprint reading are helpful.

Qualifications--Manufacturing industries require that applicants for assembly-line jobs be at least eighteen years of age. Employers generally prefer younger workers for beginning positions in this field. They feel that with further training and schooling these employees may develop into highly skilled technicians or may be able to handle the job of supervisory technician.

The ability to work rapidly and steadily with maximum accuracy is very important. The close working quarters on many assembly lines require that an assembler have a congenial personality and the ability to get along with fellow employees.

Advantages and Disadvantages--Advancement opportunities are great for the semi-skilled, such as higher pay as the worker develops the ability to do more than one job. Assemblers may become inspectors or group leaders responsible for sections of the assembly line. They may be trained to operate simple testing equipment or they may become qualified to train others.

Before an assembly-line worker advances to other positions his job can become monotonous and tiring.

MAINTENANCE OCCUPATIONS

A large staff is required to keep machines and equipment in good operating condition and to make changes in the plant layout. The maintenance and repair of complex electrical, electronic, and hydraulic equipment require well-trained electricians, electronic technicians, and maintenance mechanics. Millwrights move and install heavy machinery and equipment. Plumbers and pipefitters lay out, install, and repair piping, valves, pumps, and compressors. Other maintenance employees include carpenters, stationary engineers, and sheet metal workers.

History and Future--The employment in skilled occupations, including millwright, pipefitter, and machinery repairman, is expected to increase. The number of semi-skilled workers is expected to remain relatively stable.

Work Environment--The maintenance workers are employed in plants which are relatively clean and free from dust, smoke, and fumes.

Training and Education--Training periods are required for some maintenance workers, a period of four years of training before they can perform specialized jobs. Although many craft workers acquire their skills by working with experienced workers, apprenticeship generally is the best way to learn a skilled trade.

Qualifications--Applicants for most plant jobs must be in good physical condition and have an aptitude for mechanical work.

Advantages and Disadvantages--Maintenance workers receive the same benefits as other skilled workers. They receive an average of twelve paid holidays a year. Most companies provide regular annual wage increases as well as automatic increases when the cost of living rises.

FINISHING OCCUPATIONS

Many finishing operations must be performed in automobile manufacturing. Metal surfaces must be readied for finishing, exteriors painted, interiors covered, and seats upholstered. Metal finishers file and polish rough surface areas of metal parts in preparation for painting. Platers put a thin coat of chrome on bumpers and on other parts such as grills, mirrors, and hubcaps. Sprayers operate spray guns to apply paint or other finishes to the metal parts. Polishers rub the finished surfaces by hand or polish them with a portable motor-driven buffing wheel.

Cutters, sewing machine operators, and trimmers combine their skills to provide comfortable and attractive interiors. With hand shears or an electric knife, the cutter cuts fabric or leather to the specific shape according to a pattern. The sewing machine operator sews together the upholstery sections. Trimmers arrange and fasten springs and padding or foam rubber for the seats and upholstered areas. The trimmer also installs the covering material.

History and Future--Many occupations in automobile manufacturing will increase; some will decline. The finishing occupations are expected to remain relatively stable.

Work Environment--Motor vehicle plants are, on the whole, comparatively safe places to work, although safety conditions vary somewhat among the individual departments or facilities. The rate of disabling injuries in motor vehicle plants has been less than half that of all manufacturing industries in recent years. Some plants have fully equipped hospital facilities with doctors and nurses in attendance.

Training and Education--Employees in finishing occupations are trained on the job. Finishing jobs can be learned in a few hours or days. Some can be learned in a few weeks.

Qualifications--Applicants must be in good physical condition and have an aptitude for mechanical work.

Advantages and Disadvantages--Employees receive paid vacations and an average of twelve paid holidays a year. Most companies provide regular annual wage increases, as well as automatic increases when the cost of living rises.

Marine Science

Marine science identifies those jobs related to the discovery, cultivation, and harvesting of food and minerals from fresh and ocean waters. Marine engineering and technology are involved with designing and constructing the many specialized instruments and vessels required to explore and harvest marine resources.

HYDROLOGIST

The hydrologist is concerned with the surface and underground waters in the land areas of the earth. He maps and charts the flow and disposition of sediments; measures changes in water volume; and collects data on the form and intensity of precipitation and the disposition of water through evaporation and ground absorption. The information which the hydrologist collects is applied to problems in flood control, crop production, soil and water conservation, irrigation, and inland water projects. Some hydrologists study glaciers and their sedimentation.

History and Future--The employment outlook is favorable, particularly for those with advanced degrees.

Work Environment--A hydrologist works mostly outdoors. He carries his own equipment. There is considerable walking, standing, and use of the arms and hands. The hydrologist may work in isolated areas.

Training and Education--A minimum of a bachelor's degree in geophysics or a related science is required. A master's degree or Ph.D. is needed to get ahead in the field. High school courses should include mathematics, earth science, physics, chemistry, and mechanical drawing.

Qualifications--Important characteristics include enjoyment of outdoor work, above average general scholastic ability, the ability to get along with co-workers, and especially good health.

Advantages and Disadvantages--The opportunities for travel, both within and outside the country, offer challenging and interesting possibilities to those who are interested in new faces and places. On the other hand, those whose family ties are strong may not wish to engage in travel. With sufficient employment possibilities, travel preferences may be only matters of individual concern.

HYDROGRAPHIC SURVEYOR

The hydrographic surveyer makes surveys of harbors, rivers, and other bodies of water. He determines the depth of the water usually by taking surrounding or sound measurements in relation to land masses. These surveys are essential in planning navigation projects; in developing plans for and constructing breakwaters, dams, piers, marinas, and bridges; and in constructing sailors' charts and maps.

History and Future--For the next decade the employment outlook in surveying is expected to be good. In view of the pressure for preparation in engineering as a prerequisite for professional status and licensure, opportunities will favor those who have college degrees or at least two years of junior college or institute preparation.

The demand for hydrographic surveyers will be increased by gas and water lines that require property and boundary line surveys and by the increasing demand for land and sea maps and charts.

Work Environment--The hydrographic surveyer works the usual forty hour week except when overtime is necessary to complete a survey in order that a project can be started immediately. The peak period for the surveyer comes during the summer months when weather conditions are most favorable. However, it is not uncommon for the surveyor to be exposed to all types of weather conditions.

Training and Education--Graduation from high school is considered a basic requirement for most opportunities in surveying of a professional or technical nature. Mathematics, including as many courses in algebra, geometry, and trigonometry as possible, is most important. In addition, physics, mechanical drawing, and other related science or drafting courses should be taken.

If one is interested in the professional level, a four year college program is required. In college one should pursue a program leading to a bachelor degree in engineering.

Qualifications--The hydrographic surveyor must be a physically sound, intelligent, and personable individual who prefers being outside and engaging in technical or scientific activities involving precise and detailed measurements.

Advantages and Disadvantages--Most positions with the federal, state, and local governments and with private firms provide the usual medical, pension, and insurance benefits and vacation and holiday periods.

Some survey projects involve a certain amount of hazard, depending upon the region and the climate as well as the plant and animal life.

MARINE BIOLOGIST

The marine biologist studies the life history, habits, sports, and economic aspects of fish to provide technical assistance to fish hatchery managers, federal and state conservation officials, and other interested organizations and individuals. He surveys streams and lakes to determine the types and quantity of fish which might be supported. He also develops stocking policies and performs other work in order to obtain the maximum number of fish.

History and Future--Total employment of marine biologists by federal and state agencies is not expected to expand appreciably. Additional positions may result from increased attention paid by commercial organizations.

Work Environment--The work of the marine biologist is often seasonal in nature. Overtime or weekend work during certain times of year is common.

Training and Education--A college degree is required. High school students interested in preparing for positions as marine biologists may take such courses as algebra, plane geometry, trigonometry, biology, chemistry, physics, English, geography, social studies, and physical education.

Qualifications--The marine biologist must possess good judgment. He must be able to take into account the various factors and current situations related to the sea specimens with which he is concerned. He then must make proper decisions concerning their protection, nature, and accessibility. Keen observation and interest in detail are helpful.

Advantages and Disadvantages--Because of the relatively small number of persons employed in marine biological services, advancement possibilities are somewhat limited in most states.

The top positions in marine biology are held by the directors and assistant directors.

OCEANOGRAPHER

Oceanographers conduct surveys and experiments and then collect and study the data about the motions of ocean water (waves, currents, and tides), marine life (sea plants and animals and their habits), ore and petroleum deposits (minerals and oils contained in the nodules and oozes of the ocean floor), and the contour of the ocean (ocean mountains, valleys, and depths). Many of their findings are compiled for maps, charts, graphs, and special reports and manuals. Some of the oceanographer's time each year may be spent on the water, gathering data and making observations. A large amount of oceanographic work is done on dry land and by people who never or hardly ever go to sea.

History and Future--Employment opportunities for oceanographers should be excellent in all fields of specialization.

The demand for oceanographers is accelerating as man becomes determined to learn more about the sea and its resources.

The future of this new and challenging profession, oceanography, is most promising.

Work Environment--Oceanographers in shore stations, laboratories, and research centers will work on a five day, forty hour week basis. Occasionally, they will serve a longer shift, particularly when conditions of a research experiment demand around-the-clock surveillance. Such assignments may involve unusual working hours depending on the nature of the research or the purpose of the trip.

Training and Education--Four years of college is required for beginning positions in oceanography. Students in high school should pursue an academic course including as many of the basic and advanced courses in mathematics and science as they can obtain. In college, a broad program covering the basic sciences with a major in physics, chemistry, biology, or geology is desirable.

Qualifications--An oceanographer should have a strong interest in science; an interest in outdoor activities such as hunting, fishing, swimming, boating, or animal care; and an interest in scholarly activity (reading, research, and writing).

Advantages and Disadvantages--The individual who likes the water, who enjoys life aboard ships, and who is willing to absent himself from home for periods of time will find satisfaction in certain oceanographic positions.

The individual who does not wish to leave his family or interrupt his community activities has an opportunity to seek positions where travel away from home is not necessary.

FISHERMAN

A fisherman's life varies according to the kinds of fish he seeks. Offshore or deep-sea fishermen may remain at sea on rather large vessels (from 100 to 200 feet) for weeks at a time, depending on the size of their catch and whether their ship is equipped to keep the fish fresh by refrigeration or freezing.

Inshore fishing is the term used for catching salmon, shrimp, clams, oysters and other kinds of fish and shellfish.

Bank fishing, which is done by dragging the ocean floor, is the term used for catching haddock, flounder, cod, and other bottom fish,

King crabs are trapped in huge crab pots set out with small fish as bait. The pots are left eight to twenty-four hours and checked frequently to keep the bait fresh.

Lobster trapping is similar to crab trapping, except the traps are much smaller, and it can be done easily by one or two men. Oysters are harvested by dredging or with tongs. Both oysters and lobsters must be thrown back if they are not of legal size.

History and Future--Fishing is a big industry, but it has been declining in recent years. Foreign competition, overfishing in some waters, water pollution, and old and obsolete vessels and equipment are blamed for the decline.

Some solutions suggested by the industry include federal funds to encourage the building of larger vessels, an industry-wide program of modernization, and international controls to protect against foreign fishing near U.S. shores. These measures, plus new uses for fish oils and processed fish, will revive commercial fishing in the United States.

Work Environment--Fishing is conducted commercially from coastal towns and cities throughout the United States. Off the Maine coast, fishermen trap the valued northern lobster. From Chesapeake Bay and Alaska come prize crabs. The Gulf of Mexico yields fine shrimp and oysters. Pacific coast fishermen bring in tuna, halibut, salmon, flounder, mackerel, ocean perch, and other deepwater fish, as well as bank fish and shellfish.

The fisherman may have to work for hours in the salty spray, and the work of loading, packing, and sometimes cleaning the fish is taxing on every muscle.

Training and Education--There are no formal educational requirements for fishermen and many teenage boys learn the trade from their fathers or other relatives. There is an increasing enrollment in special short courses, such as general seamanship, navigation, meteorology and weather communications, boatbuilding and boat maintenance, scientific commercial fishing, and fish marketing.

Such subjects are taught in the high school curriculum in some port cities; elsewhere they are offered at trade and vocational schools and at some colleges.

Qualifications--Courage, expert seamanship, mechanical ability, physical stamina, and a good head for business are the first requirements for the fisherman.

Patience and the ability to get along with others in close quarters are important. A fisherman working under a captain must be able to take orders; yet in an emergency he must assume responsibility with a cool head.

Advantages and Disadvantages--There is both a physical and financial risk in fishing. Price fluctuation, accidents at sea, storms, fires, and competition from foreign fishermen all continue to make fishing uncertain from month to month. For the adventurous man these risks are offset by the lure of the sea, the chance to go into business for himself, and the joy of working outdoors.

FISH CULTURE TECHNICIAN

The fish culture technician produces fish for game or food. He may hatch fish eggs, raise them to releasable size, and use them for stocking purposes, or he may buy young fish, raise them, and market them as a farm crop.

Fish hatchery (fish culturist) technology is the largest branch of fish culture at the present time. The technician's work consists of raising and spawning brood fish, caring for the eggs, feeding the young fish, cleaning ponds, maintaining hatchery grounds and equipment, planting the fish, and keeping accurate records.

Technicians trained in fish wildlife conservation generally assist biologists in the performance of field work in fish conservation programs. They may be required to gather field data, engage in habitat improvement programs, maintain fishways and ladders, and improve streams.

The experimental biology technician assists biologists in field and laboratory work involving fishery research investigations. The work seldom involves the raising of fish but instead may result in experiments to test new foods for fish, evaluate, tag, and mark certain species, and observe developments first in the laboratory and then in the field.

History and Future--Several factors suggest a very favorable long-range employment outlook for fish culture technicians. The ever growing population, the loss of many marine life species due to pollution, and the popularity of fish not only as a food supply but for sport and home aquariums all contribute to an increasing need for qualified professionals in the field of fish culture technology.

Work Environment--Most technicians perform the majority of their work outdoors in all kinds of weather. The nature of the work requires them to be around all kinds of water. The strong smell of fish may be one unpleasant aspect of the job. In performing laboratory work, fish culture technicians will enjoy clean well-lighted facilities.

Training and Education--A high school education is basic to qualify for positions in fish culture technology. Any student considering this field should take courses in biology, chemistry, physics, and mathematics. English is very important because the technician is playing an ever-increasing role in report writing. Legible handwriting is desired, along with typing ability.

Qualifications--The technician must like working with his hands. The bulk of his work involves physically carrying out an assignment, not just thinking about it. He is almost always in contact with the public and should have a pleasant personality. Assignments may involve long hours in the field even on weekends and evenings, so the technician must also be in excellent health.

Advantages and Disadvantages--Due to the newness of the occupation, advancement standards are not as rigid as in other professions. Generally, the requirements for advancement consist of the extent of training, the willingness to keep abreast of complex technological changes, and the commitment which the technician brings to his job.

MARINE LIFE TECHNICIAN

The marine life technician is concerned with the biological side of oceanography, the life that teams in the sea, from microscopic animals and plants to whales and giant kelp. The marine life technician gathers, sorts, classifies, analyzes, processes, breeds, and farms marine life.

Marine life technicians may gather and sort marine life in the waters of bays, oceans, sounds, and estuaries (an arm of the sea at the lower end of the river). They may harvest, process, and classify special kinds of seaweed, seaworms, shellfish, and fish for use in pharmaceutical products, as fish bait, or as biological specimens.

History and Future--The employment outlook for both men and women is excellent.

Work Environment--Working conditions vary. Work in the field generally calls for long, irregular hours and physical strength. The work is often performed outdoors in all kinds of weather. Some jobs call for a forty hour week in clean, comfortable surroundings.

Training and Education--High school graduation is necessary; courses should include as much biology and chemistry as possible. The prospective technician should then attend a two year junior college or technical institute, earning an associate degree. Courses will include English, technical mathematics, chemistry, marine botany, zoology, and biology.

Qualifications--Marine life technicians must love the sea, be manually dexterous, and have excellent eyesight. (Corrected vision is acceptable.)

Advantages and Disadvantages--Marine technicians may work as consultants with sonar equipment manufacturers, sharing their knowledge of marine life sound emissions, or as specialists on a fishing boat.

Although job titles may not change, salary increases with experience.

DIVER

Tasks performed by the diver are varied but are considered to be of either an engineering or a scientific nature. Increasingly, he is performing construction, inspection, and salvage jobs.

The surface supplied and system diver is more likely to be involved in a construction, salvage, or offshore crew where he builds or inspects bridges, dams, or waterfront installations.

He may also assist in salvaging sunken ships or in the performance of both salvage and construction duties.

Insurance companies and police departments often enlist the aid of divers to recover bodies or obtain valuable evidence.

The diver using self-contained diving equipment may perform such underwater tasks as surveying, inspecting, photographing, and collecting. He is often a highly skilled explorer, diving for buried treasure, working as part of a team charting the ocean floor, or gathering plant and animal specimens for scientific study.

History and Future--The jobs for divers are increasing with the development of more and safer diving equipment and with the growing interest in the sea as a source of oil, minerals, and food.

Work Environment--The work of the diver is performed underwater. The length of time spent underwater will vary with the job and the depth at which it is performed. Some divers stay underwater at least four hours or more at the depth of 150 feet.

Training and Education--The high school student desiring to become a diver should study physics to gain a knowledge of pressure and gas laws. Mechanical courses, such as gas and electric welding, blueprint reading, mechanical drawing, and metallurgy, will be helpful. Skills in the use of pneumatic tools is desirable.

Qualifications--The diver must be in excellent physical condition with weight in correct proportion to his height and build. He must be adaptable and able to withstand extremes of temperature.

Advantages and Disadvantages--The diver who combines scientific study with diving has possibilities for advancement. There is much yet to be learned about the fascinating world under the sea, and the scientific diver has the opportunity of exploring this new world and of taking part in exciting underwater research. He can become a recognized leader in an exciting area of exploration.

There are many hazards faced by the diver in his underwater occupation.

MARINA WORKER

Many marinas offer complete maintenance, repair, and repairing services in their shops. Workers may be as busy during the winter storage season as they are in summer.

The work in large marinas varies according to the services offered. Some operate charter boats for excursions and deep-sea fishing.

Some marinas offer diving and salvage service.

Most marinas are operated together with a franchised dealership for selling boats, marine engines, boat trailers, and other equipment.

History and Future--Boating is one of the fastest growing leisure time activities in the United States. With the growth in the number and size of marinas, there will almost certainly be a need for an increasing number of workers to handle and supervise the services that marinas provide.

Work Environment--Some marinas provide care for several thousand boats, outfitting yachts for long trips and providing onshore accommodations for boaters. Such huge marinas might have a staff of twenty or more.

However, some marinas are small with only a gas pump, an office and repair shop, and dock space for four or five boats. In this kind of operation the owner and one assistant may constitute the whole staff.

Training and Education--The first step for a high school student desiring to become a marina worker is to finish high school. The prospective marina worker should attend a technical and vocational high school or take evening courses in engine and engine repair.

The marina worker can also learn more about repairing and caring for marine engines by taking one of the two or three week courses offered by several large manufacturers of marine engines.

Qualifications--A ma[illegible]rker should genuinely like boats and people associated with boating.

Advantages and Disadvantages--An unskilled worker is not likely to earn much more than the minimum hourly wage until he develops greater ability.

Skilled workmen are paid on an hourly basis, especially if the workmen are hired only as special jobs arise.

Tipping is good in the luxury marinas, in those in fairly expensive resort areas, and in marinas where chartered trips are arranged.

SHIP DESIGNER

The job of a ship designer is to provide all the necessary support systems that will enable the ship to carry out its task properly. He is a type of community planner, and the size of the community he plans for may range from a small number of crew members aboard a freighter to large numbers of military personnel aboard an aircraft carrier.

Although each ship may have its own special design, designers must solve problems that are common to all ships, such as providing living accommodations for the crew and passengers. This also includes necessary services such as electric power, water, food, and sanitation. The ship must be designed with space for equipment, fuel, and cargo. Material handling systems must be designed for quick and efficient handling of the payload.

The ship must be designed so that it is sturdy enough to withstand the pounding of huge waves. Other safety precautions include dividing the ship internally into watertight compartments so that if it is damaged it will have a good chance to stay afloat. The overall design of the hull or body must allow the ship to move easily through the water. Above all, the ship must be designed to operate economically so that the operation and maintenance costs will be less than the revenues it will earn by carrying passengers and cargo.

Designing a ship to meet these specifications is a complicated job.

History and Future--Ships have been designed in various ways ever since men first traveled over water in hollowed logs. The Norse longship, the trireme of the Greeks and Romans, the Spanish galleon, the paddle-wheel steamer, and the screw-propeller steamship are all milestones in the continuing development of ship design.

Ship designers have played an important role in the history of the United States. In the 1850's American clipper ships sailed at speeds that are still unmatched. These ships were designed to carry unusually large amounts of sail. During the Civil War, American ship designers created the early ironclad warships, the *Monitor* and the *Merrimac*.

Until a hundred years ago, ships were designed by the craftsmen who built them, without benefit of any real understanding of the natural laws affecting the success of their product. Gradually, however, naval architecture became a profession as engineers learned to apply physical laws and mathematical techniques to analyze or predict ship performance. That led to accelerated improvements in ships and created a demand for formally educated designers.

Several factors make the future for ship designers particularly attractive. The number of graduates who enter the field each year is not enough to fill the positions available. The Merchant Marine Act of 1970 allows for the construction of as many as three hundred merchant ships by 1980. This means that ship designers will have to come up with new ideas and designs for ships to meet the transportation needs of the future.

Work Environment--The ship designer usually works thirty-five to forty hours a week, although his hours may sometimes be irregular when he is working to meet a contract deadline for a government agency or a private firm. At the junior levels he usually gets compensation for overtime work through either extra pay or extra time off from the job, depending on his employer's policy. The vacation time he receives varies according to whether he works for a private firm or for the government, but he usually has at least two weeks annually at the start and more later on.

Training and Education--Ship designers need an extraordinarily broad education in many branches of engineering, science, and mathematics. The necessity for this type of education is based on the fact that ships are the largest self-sufficient mobile structures made by man.

The high school student who is interested in ship design must plan on taking a college preparatory program. He should make a special effort to master courses in science, mathematics, and English. If possible, courses in mechanical drawing and computer programming should be included in the curriculum.

Qualifications--The ship designer needs to have a powerful visual imagination; at the same time, he must be able to translate his ideas into practical specifications.

He must be able to think logically, write clearly, and get along with people, since the work of building a ship requires the cooperation of many kinds of workers.

Advantages and Disadvantages--There are advantages to being a ship designer. The person who is interested in ships and the sea will probably feel a natural attraction to the work. Solving complicated problems of designing a ship and keeping up with new developments in the field make the work interesting. The job is also pleasant, for it enables a designer to split his time between doing close detailed work in an office and working with people on location during the construction, outfitting, and testing of a vessel.

There are occasional hazards on the job. Designers must climb ladders and walk on scaffolding from time to time while supervising work. Some of the equipment they work with is dangerous. However, many precautions are taken against accidents.

BOILERMAKER (SHIP)

The boilermaker works at the site where the boiler, tank, or vat is to be installed and put into use. Such sites include petroleum producing areas where storage tanks are to be filled, refineries where gasoline is made, schools and other institutions requiring large heating boilers, factories where boilers are used to generate power to run machines, and atomic energy plants where installations must withstand very high pressures.

Boilermakers find much work in the ship and boat building industry. They repair hulls, bulkheads, and decks and remove damaged parts by drilling out rivets and cutting off the heads with a chipping hammer.

History and Future--The expectation for the next decade or so will be approximately 600 job openings annually in the boilermaking occupations because of expansion, deaths, retirements, and transfers of journeymen boilermakers to other trades.

Work Environment--Boilermakers often work close to dangerous equipment. They must manage heavy materials and climb to considerable heights when constructing oil refineries, water storage tanks, and similar installations. The work requires physical exertion and must be carried on under extremes of heat, poor ventilation, noise, and dampness. At times it is necessary to work in cramped quarters inside boilers, vats, or tanks.

Training and Education--It is essential for an applicant to the boilermaker trade to possess a high school diploma. High school courses should include blueprint reading, welding techniques, the physics and chemistry of various metals, and shop mathematics.

Qualifications--Mechanical aptitude and manual dexterity are important qualifications. A strong body is necessary because the work is strenuous, and stamina is needed to meet continuous exertion. Tolerence of odors, noisy surroundings, and height is required on many jobs, and it is essential that the worker be able to work in close quarters inside boilers.

Advantages and Disadvantages--Great progress has been made in recent years in decreasing the accident rate by means of the safety programs of employers and unions and by the use of protective equipment, but the rate of injuries in boiler shops remains higher than average for all manufacturing industries.

Union contracts provide fringe benefits for most boilermakers, such as insurance, hospitalization, surgical, accident, sickness, life pension plans, and paid vacations.

DIESEL MECHANIC (SHIP)

The diesel mechanic removes, replaces, and adjusts such items as fuel pumps, injectors, piston rods, crank shafts, and bearings. One of the most frequent repair jobs is the resetting or regrinding of exhaust, intake, and air valves.

When a diesel mechanic rebuilds an engine, he takes the whole engine apart. This is usually scheduled at regular intervals, such as eighteen months or 100,000 miles.

History and Future--Increased use of diesel equipment has produced a demand for mechanics to maintain, repair, and overhaul it. A qualified diesel mechanic has been hard to find in the past decade. Diesel power will be the predominant source of power in the future. Therefore, the employment outlook for diesel mechanics is good.

Work Environment--The diesel mechanic in a ship yard works a forty hour week, although in some shops, because of the need for emergency repairs, overtime is rather frequent. Some shops may have round-the-clock shifts. Extra pay is given for night work.

Training and Education--The applicant should show satisfactory performance in high school where he has had courses in shopwork, mathematics, and science.

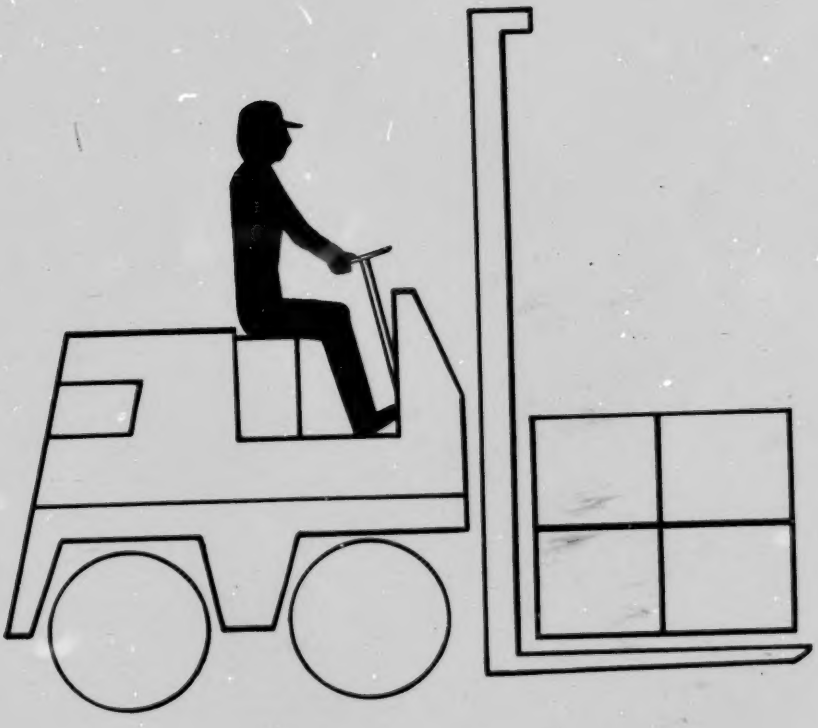
Qualifications--The diesel mechanic should be of average intelligence with good mechanical aptitude.

Advantages and Disadvantages--There are many hazards in this occupation. Heavy lifting may cause various injuries. One may receive a burn while steam cleaning an engine or touching a hot engine. Slipping on a greasy floor is another hazard. Most places of employment have adequate safety procedures to minimize the danger.

Some of the fringe benefits are time and a half for overtime, paid vacation and holidays, and health and life insurance.

The work of a diesel mechanic is challenging because of the variety of problems which occur requiring intelligence and mechanical aptitude to arrive at solutions.

Marketing and Distribution



Opportunities are almost unlimited in a variety of marketing and distribution occupations. Some of the occupations require ingenuity and responsiveness to the changing demands of customers; others offer an outlet for artistic talent or writing ability. Management positions make use of the art of getting along with people and organizing activities, and other jobs involve the performance of physical tasks such as sorting and transporting merchandise.

SUPERVISOR

The supervisor supervises and coordinates the activities of highly skilled, semiskilled, and unskilled workers, and often is responsible for millions of dollars worth of equipment and material. The supervisor is responsible for the guidance and instruction necessary to assure that workers are qualified to handle their assignments and to see that new employees are properly trained for their jobs. The supervisor must see that safety rules and regulations are observed and must instruct employees in safety practices.

History and Future--The future employment of supervisors is expected to increase moderately. A great number of job openings will occur each year as experienced supervisors are promoted, transferred to other occupations, retired, or deceased. Retirement and deaths alone are expected to result in more than 30,000 openings annually.

Work Environment--Supervisors spend most of their time coordinating activities on the company floor. Supervisors generally work more than forty hours a week and often are expected to be at work before the other workers arrive and remain there after they leave.

Training and Education--Employers generally look for experience and skill rather than specific educational background when choosing supervisors. The experience gained by supervisors rising through the ranks gives them the advantage of knowing how a job should be done as well as the possible problems involved. Also, experience helps the supervisors know what to expect from the workers they supervise. Most workers who are promoted to supervisor positions are high school graduates who have learned their skills on the job.

Qualifications--Employers look for leadership qualities when considering persons for supervisor positions. Especially helpful is the ability to motivate employees, to command respect, and to get along with people.

Advantages and Disadvantages--Employers will hire college graduates as supervisors' helpers to undergo on-the-job training until they are capable of accepting the supervisory responsibilities. After attaining this experience, supervisors having college training often are promoted to higher management levels.

Some supervisors around machinery may be subjected to noisy operations.

FLOOR MANAGER

The floor manager manages and coordinates the activities of all the workers in one department of a store. He or she assigns duties to other employees, hears customers complaints, and reorders new stock for his department. The floor manager is responsible for the operation of an assigned department.

History and Future--There is an increasing need for more floor managers because of the many department stores and shopping centers that are being constructed. The employment outlook is excellent.

Work Environment--The floor manager manages personnel such as bookkeepers, clerks, checkers, wrappers, baggers, stock boys, and meat cutters. His work is usually performed in a supermarket or department store.

Training and Education--Many floor managers work their way up through the ranks of store personnel after high school graduation.

Qualifications--The successful manager must have the ability to handle many business matters and get along well with customers and employees.

Advantages and Disadvantages--Graduates of a two year management program can start with higher salaries than high school graduates. Also, much standing is required, and many managers work six days a week.

RESEARCH DIRECTOR

The research director assembles and analyzes information needed for effective advertising programs. He studies the possible uses of the product and its advantages and disadvantages. Some workers may make special surveys of the buying habits and motives of customers or may try out sample advertisements to find the most convincing selling theme or the most efficient media for carrying the advertising message.

History and Future--The demand for marketing research services is expected to increase rapidly through the 1970's. Marketing research will expand and new marketing departments and independent research firms will be set up.

Work Environment--Marketing research workers usually work in modern, centrally located offices. Some, especially those employed by independent research firms, do a considerable amount of traveling in connection with their work. Also, they may frequently work under pressure and for long hours to meet deadlines.

Training and Education--A college degree is the usual requirement to become a marketing research trainee. Courses valuable in marketing research are English composition, speech, psychology, and economics.

Qualifications--Marketing research workers must have the exceptional ability to recognize and define problems. Also, their work calls for the ability to analyze information and to write reports which will convince management of the significance of the information.

Advantages and Disadvantages--In 1970, marketing research directors' salaries were about $20,000 annually. However, directors often work under pressure and for long hours to meet deadlines.

STATISTICIAN

A statistician is trained to analyze problems, to design experiments whose results may yield some answers to the problems, and to interpret the results when they are obtained.

History and Future--In recent years, the number of graduates with a degree in statistics was barely enough to replace those who retired or died. Employment opportunities for well qualified statisticians are expected to be favorable through the 1970's.

Work Environment--Statisticians are employed in all industries; about two-thirds of all statisticians were employed in private industry. Although statisticians are employed in all states and areas, about one-third of them work in three metropolitan areas: New York, Washington, D.C., and Los Angeles and Long Beach, California.

Training and Education--A bachelor's degree with a major in mathematics is the minimum educational requirement for many beginning positions in statistics.

Qualifications--The statistician must have an interest in mathematics and the ability to translate problems into statistical terms.

Advantages and Disadvantages--Statisticians employed by colleges and universities generally earn less money than those empioyed by private industry and the federal government.

SCIENTIST (CHEMIST)

The scientist in marketing performs experiments and gives expert information in the various fields of science for the benefit of marketing management.

The scientist must be a marketing expert and must be familiar with all aspects of products. He or she is involved in developing new products and improving old ones.

History and Future--The growth of science as a profession has been phenomenal during the past three decades. The scientist will make significant contributions by opening new doors to products and processes that do not exist but that provide the opportunities for creative discovery tomorrow.

Work Environment--Scientists in marketing are mostly employed in chemical companies. Some work for private research institutes and foundations.

Training and Education--A good background in biology, chemistry, mathematics, English, and physics and a concentration on developing good reading and writing skills are essential.

Qualifications--A scientistt must be willing to work for long periods before discovering the answer to a problem. He must also be able to follow through on every detail of his work, no matter how routine it may be.

Most executives are influenced by grades when hiring, and grades will continue to be the measure of ability in the selection of promising scientists until a more reliable one can be found.

Advantages and Disadvantages--Salaries are high for scientists, especially in government agencies.

Laboratory work can be unpleasant and sometimes even dangerous depending on the chemical used. However, the chemical industry has an excellent safety record because of the special care taken in the handling of dangerous materials.

SURVEY WORKER

Surveyors play an important part in the construction of highways, airfields, bridges, dams, and other structures by providing information on measurements and physical characteristics of the earth's surface.

Surveyors often specialize in one particular type of survey. Those doing highway surveys are concerned with establishing the points, grades, and lines needed for highway locations. Those performing land surveys locate boundaries of a particular tract of land, prepare maps, record plots of the land, and prepare legal descriptions of it for deeds, leases, and other documents.

History and Future--Employment opportunities for surveyors will continue to grow rapidly because of the rapid growth of urban areas. This growth will create requirements for additional surveyors to locate boundary lines and to lay out streets, shopping centers, schools, and recreation areas.

Work Environment--Surveyors usually work an eight hour day and a five day week. They sometimes work longer hours during the summer months when weather conditions are most suitable for surveying activities. The work is active and sometimes strenuous. Most of their work is completed out of doors.

Training and Education--The applicant must be a high school graduate with a background in math and mechanical drawing. One, two, or three years of on-the-job training are necessary.

Qualifications--A surveyor must have sound health and a strong liking for outdoor work. Because most surveyors must supervise and direct the work of others, leadership qualities also are important.

Advantages and Disadvantages--Many openings will result each year to replace surveyors that continue training or that transfer to other occupations.

Employment opportunities for women surveyors may be limited, primarily because much of the surveyor's work is strenuous.

BROKER

A broker is sometimes called a security salesman. Securities are stocks and bonds. He or she usually works for a firm of stockbrokers. A brokerage firm is concerned mostly with trading in stocks and bonds for customers. The broker watches the stockmarket carefully and advises customers what to buy and sell.

The broker arranges for the sale and purchase of stock for his customers.

History and Future--Since 1960, the number of brokers employed has doubled. The outlook in this field will remain good as long as the nation's economy is sound, the overall price of stocks rises, and the number of investors increases.

Work Environment--The broker is responsible for channeling the customers' money into stocks and bonds.

Training and Education--Mathematics, English, and learning to speak and write well are very important for a broker. A college education is also essential.

Qualifications--Brokers must be responsible and trustworthy. They must have an alert and well-trained mind that is attentive to details, a tactful manner, and an appreciation of the value of listening to the customers.

Advantages and Disadvantages--From an earnings standpoint, the work offers unlimited opportunity to the conscientious and ambitious person provided the stock market is on the upswing. But when the prices of stocks are going down, the broker's earnings will not be as high. Also, investment houses may cut the number of brokers employed if a decline persists.

JOBBER

A jobber is also known as a distributor. A distributor stocks thousands of different products, buying them at his own risk and trusting his knowledge of the market for resale to retail stores and business users. The distributor provides convenient means to supply his customers' needs through salesmans' calls, telephone order services, or through printed forms supplied by him.

History and Future--Over the past twenty-two years, distribution has grown at a rate nearly four times faster than manufacturing.

Work Environment--Distributors work with hundreds, even thousands, of manufacturers by assembling in their warehouses large quantities of a vast variety of merchandise in smaller quantities to retailers, contractors, and other businesses.

Training and Education--More and more engineering skills are desired for distributors to advise and serve customers who need the most advanced products technology can produce.

Qualifications--Distributors should be able to boss themselves and have the initiative and drive to stay on the job.

Advantages and Disadvantages--Distributors are non-supervised employees. They determine their own working hours. The distributor buys thousands of products from manufacturers at his own risk and trusts his knowledge of the market for resale to retail stores and businesses.

FOREIGN LANGUAGE STENOGRAPHER

The foreign language stenographer is known as a technical or senior stenographer. He or she takes dictation in foreign languages and transcribes the material on a typewriter to another language.

The foreign language stenographer specializes in shorthand.

History and Future--As the United States continues to expand business with foreign countries, the increased communications will lead to a rapid expansion in the employment of foreign language stenographers.

Work Environment--Most stenographers work a forty hour week in most cities. In the northeastern part of the country, the scheduled workweek is thirty-seven and one half hours.

Training and Education--Most employers prefer applicants with a bachelor's degree in secretarial science. The stenographer should be able to take dictation at least eighty to one hundred sixty words per minute.

The foreign language stenographer should have a good background in foreign languages, grammar, spelling, punctuation, and vocabulary.

Qualifications--Employers seek workers who are poised, alert, and have pleasant personalities. Discretion, good judgment, and initiative are also important.

Advantages and Disadvantages--Technological changes are not expected to change the growth of employment for foreign language stenographers.

Foreign language stenographers must be exceptionally rapid and accurate, sometimes taking notes in a technical language from many different types of speakers and for extended periods of time.

ADVERTISING AGENT

The advertising agent works on policies such as the type of advertising budget, the agency to be employed, and the work with the agency in planning and carrying through the program. He also supervises the preparation of special sales brochures, display cards, and other promotional materials.

History and Future--Opportunities should be favorable for advertising agents as more and more advertisers turn their work over to agencies.

Work Environment--Advertising agents frequently work under great pressure. Working hours are sometimes irregular because deadlines must be met and last minute changes are not uncommon. Persons in creative jobs often work evenings and weekends to finish important assignments.

Training and Education--Most employers prefer college graduates. The applicant should have a good background in both spoken and written language.

Qualifications--The advertising agent should be able to accept criticism with tact. He must also have initiative, drive, and talent.

Advantages and Disadvantages--Advertising is a satisfying career for persons who enjoy variety, excitement, and a constant challenge to their creative ability. However, many applicants will face stiff competition for jobs in these occupations.

TEACHER (MARKETING)

The marketing teacher gives instructions in the field of marketing, advertising, salesmanship, purchasing, and research. The instructions may include lectures, class discussions, demonstrations, and counseling and assisting individual trainees.

History and Future--College graduates trained in marketing education are likely to find favorable job opportunities because of the growing complexity of marketing.

Work Environment--Marketing teachers are on the job year round; therefore, they receive higher salaries than teachers employed for the academic school year.

Training and Education--A college degree is required. Many employers prefer a university teacher of marketing with a good knowledge of marketing, statistics, English composition, speech, psychology, and economics.

Qualifications--One must have the ability to speak, demonstrate, and counsel with people.

Advantages and Disadvantages--Most marketing instructors receive higher wages than other instructors. The marketing instructor must continue in higher education because better salaries are paid at the Ph.D. level.

SALES ENGINEER

A sales engineer helps prospective buyers with technical problems. He or she may spend days or weeks analyzing a firm's manufacturing problems to determine the kinds of equipment and materials best suited to its operation. Sales engineers spend most of their time visiting prospective customers. They also do some paperwork including reports on sales prospects in their territories or on customers' credit ratings.

History and Future--The number of sales engineers is expected to rise moderately due to general economic growth. The development of new products and improved marketing techniques probably will heighten competition among manufacturers.

Work Environment--Some sales engineers have large territories and do considerable traveling or their territory may cover several states.. Therefore, the sales engineer is away from home for days or weeks at a time. Others may work in the neighborhood of their home base in a small area and commute from home.

Training and Education--High school graduates can be successful sales engineers, but college graduates are preferred. Many companies have formal training programs lasting two years for on-the-job training.

Qualifications--A pleasing personality and appearance and the ability to meet and get along well with many types of people are important. Arithmetic skills are an asset.

Advantages and Disadvantages--The sales engineer gets company benefits including life insurance, pensions, and hospital, surgical, and medical benefits. Some sales engineers travel at night or on weekends. Frequently they spend evenings writing reports and planning schedules.

WAREHOUSEMAN

The warehouseman is responsible for all merchandise and products received and shipped out of the warehouse. The warehouseman may pack and wrap goods for shipment, decide on the mode of transportation, distribute merchandise properly, process damage claims, and trace lost merchandise.

History and Future--Several thousand openings for warehousemen are expected annually as employment rises, as workers retire or stop working for other reasons, or as they transfer to other types of employment.

Work Environment--The working conditions vary. Some warehousemen work for newer shopping centers or large department stores in comfortable, air conditioned, well-lighted, and heated basement areas. Others may work in large warehouses that are cold, somewhat open, poorly lighted, and dusty.

Training and Education--High school graduates are usually preferred for beginning warehousemen with a knowledge of math and the ability to write legibly. Some employees are given on-the-job training under the supervision of an experienced worker.

Qualifications--One must be capable of independent judgment.

Advantages and Disadvantages--Some warehousemen who acquire post high school training or take courses in transportation may eventually advance to warehouse manager, industrial traffic manager, or purchasing agent.

INSPECTOR

The inspector must examine closely items that are manufactured to make sure they operate properly. Inspectors use a variety of methods in order to be certain that the products they examine are in proper order. They may merely look for scratches or other defects in products or parts.

Semiskilled inspectors may be required to read simple work orders and do arithmetic involving decimals and fractions. Inspectors often keep records of the number of parts they have accepted and rejected.

History and Future--The employment of inspectors is expected to increase slowly through the 1970s creating several thousand job openings annually. However, most opportunities will result as workers retire, die, or transfer to other fields of work. Deaths and retirements alone will account for 15,000 openings each year.

Work Environment--Working conditions vary considerably for inspectors. Some may work in well lighted, air conditioned work places in an aircraft missle plant. Others who work on the production floor of machinery or metal fabricating plants often are exposed to high temperatures, oil, grease, and noise.

Training and Education--Many employers may hire applicants who do not have a high school diploma if they have the ability to work with numbers and can do work requiring constant attention.

Qualifications--Many employers look for applicants who have good health and eyesight, can follow directions, and are dependable.

Advantages and Disadvantages--Most industries employing inspectors provide for fringe benefits such as paid holidays and vacations, health insurance, and retirement pensions.

Some semiskilled inspectors supplement their work experience with formal educational courses such as blueprint reading.

DELIVERYMAN

The deliveryman drives a panel or light truck over an assigned route, selling or delivering goods or providing services such as collecting and delivering laundry and dry cleaning.

The deliveryman loads or supervises the loading of his truck. The amount of merchandise in his truck generally is checked by another employee. Some deliverymen deliver merchandise previously ordered and obtain orders for future deliveries. Others make immediate sales from the stock in the truck. In either case, they must collect payments and keep records of their transactions.

History and Future--The number of retail deliverymen declined following World War II, particularly among drivers handling milk and dairy products. However, opportunities for employment as vending machine deliveryman and laundry and drycleaning deliverymen will be excellent throughout the next decade.

Work Environment--The number of hours worked by deliverymen varies. Some work only thirty hours a week while others work as many as sixty hours a week depending upon whether the individual has a well established route or whether he is trying to build up a new one.

Training and Education--Most employers prefer their deliverymen to be high school graduates, to be capable of simple arithmetic, and to be able to write legibly.

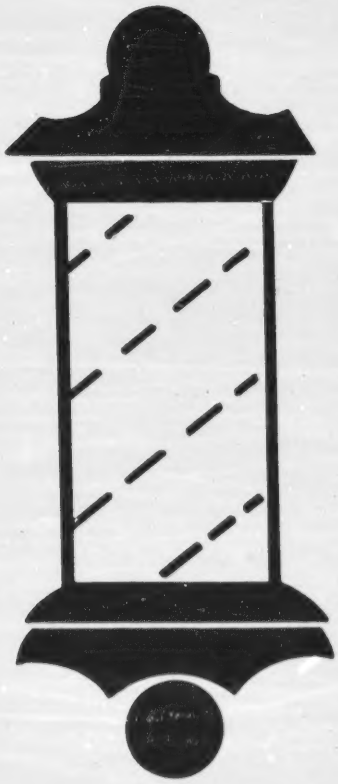
In most states a deliveryman is required to have a chauffeur's license, which is a commercial driving permit.

Qualifications--In addition to being a good driver, a deliveryman must have sales ability, a thorough knowledge of the product or service he is selling, and a persuasive personality.

Advantages and Disadvantages--The deliveryman does not work under strict supervision. He may decide how fast he will work and where and when he will have his lunch or rest periods. This freedom of action and the daily meeting and dealing with people on the route appeals to many young men.

Many deliverymen have to make deliveries in bad weather and do a great deal of lifting, carrying, and walking up and down stairs.

Personal Service



Employment in the personal service area is expected to increase rapidly. Major factors contributing to the sharp growth in the demand for these services are expected to stem from population growth, rising personal incomes, and an expanded interest in personal and family comforts. The personal service area offers job opportunities to both women and men with various levels of skills and differing degrees of training and education.

Most production operations are the same in all types of laundries. Sorters or identifiers separate the linen and garments into as many as twenty classifications based on degree of soil and the washing or drycleaning process required.

The washman adds cleansing agents (supplies) and controls the various valves that regulate temperature, water level, suds, and rinses.

As garments emerge from the machine, a flatwork-folder operator folds them.

Articles such as blankets, curtains, and draperies require special treatment. The blanket washer operator operates a special washing machine.

Menders make minor repairs and sew on missing buttons with a button-sewing machine.

Finally, the clothing is inspected by assemblers, who gather the articles belonging to each customer. After bundle wrappers or building machines wrap them, the packages are ready for the driver to pick up for delivery, and the cycle is completed.

History and Future--The continuing expansion of specialized laundries has created more stable employment opportunities. Today, there is a larger number of good jobs in supervisory and managerial capacities than there are qualified persons, and indications are that this condition will prevail through the 1970's and 1980's.

Work Environment--Laundries are located in all parts of the country; jobs are easy to find.

Some of the jobs may prove monotonous, and the hot, steamy work areas can make working conditions unpleasant.

Training and Education--Completion of eighth grade or a year or two of high school is sufficient for most of the production jobs; supervisory and managerial work does call for additional education.

Qualifications--The basic requirements are speed, muscular coordination, manual dexterity, and good eyesight. Physical strength and endurance are important.

Advantages and Disadvantages--The field is easy to enter. There are almost no educational barriers, and the training period is short. Jobs are easy to find.

Although the pay has been low in the past, changes in the minimum wage law are bringing the wage structure into line with that of other industries.

HOUESHOLD WORKERS

There are many kinds of household workers. Among them are cooks, general household workers, babysitters, nursemaids, butlers, gardeners, and chauffeurs. The housekeeper manages the household. She or he assigns and directs the activities of maids, laundresses, and other workers.

In some large homes a butler supervises household employees, assigning and coordinating their activities. He takes care of serving meals or directs maids in this work. He also performs various personal services, such as mixing cocktails and receiving and announcing guests.

The general maid has a variety of duties, such as cleaning and dusting, changing and making beds, watching children, purchasing groceries, preparing and serving meals, and washing and ironing clothes.

The nursemaid is responsible for the children, their laundry, meals, and rooms.

The gardener has complete charge of the grounds; the chauffeur maintains and drives the family car or cars.

History and Future--Any worker who takes the trouble to develop skills in household work should have no trouble finding employment. Today, household workers can practically name their own price and, in addition, may obtain certain benefits.

Work Environment--Some full-time housekeepers live in the homes of their employers and others live out. The hours of the household worker will vary, but generally the day will begin at breakfast and end when the evening dishes are done.

The day worker will probably work an eight hour day.

Training and Education--Some vocational schools offer instruction in household and domestic occupations. High school work in economics would be very helpful.

Qualifications--Most employers who employ household workers look for neatness, a pleasant personality, and honesty.

Household workers should also have initiative and self-discipline.

Advantages and Disadvantages--Because of the chronic shortage of capable household workers, the well-qualified household employee usually has a choice of jobs.

Many household workers are not covered by social security pension plans, disability insurance, and medicare. There are many employers who do not wish to report or pay the tax required. The household worker should ask the employer to fill out the required social security forms and pay the tax.

HOTEL AND MOTEL WORKERS

Hundreds of employees with varying degrees of skill and training work in hotels.

The doorman usually makes the first contact with the newly arrived guest. He assists with the luggage, and he may summon a bellman to assist him. The motel guest may be met by a garage attendant, who will care for the guest's car while he registers.

The room clerk or desk clerk gives the guest information on rates and the kinds of service available. Then he assigns rooms.

The reservation clerk handles reservations that are made by mail or phone.

The rack clerk inserts or removes forms that indicate when a room becomes occupied, vacant, or closed for repairs.

The information clerk answers questions regarding transportation, theaters, restaurants, and local points of interest.

The executive department is headed by the general manager, who is in charge of the overall operation of the hotel. He also makes decisions concerning hotel policies, such as rates and charges for services, personnel hiring requirements, credit sales promotion, and publicity.

History and Future--The opening of New York's Astor House in 1836 spurred the building of luxurious hotels in the U.S. Soon, every city or town of any size had its grand hotel.

A fairly steady demand for hotel workers is expected to continue. Many thousands of openings result each year from turnover.

Work Environment--Most hotel employees work a forty hour week. They may be on duty during any one of three shifts, but fewer work at night than during the day. Irregular shifts are common.

Most workers receive paid vacations, usually one or two weeks a year.

Training and Education--Completion of grade school is preferred for unskilled jobs in hotels. Some employers accept young people who have attended community or neighborhood job-training courses. More and more employers are seeking high school graduates who can be trained to take over responsible positions.

Qualifications--Patience and tact are needed in hotel work. Executive workers must have poise and the ability to get along with the public. Pride in personal appearance is an important trait for hotel employees.

Advantages and Disadvantages--Free meals, life insurance, and medical assistance are often included as fringe benefits for hotel workers.

Many aspects of hotel work are physically demanding. Most hotel workers are on their feet all day. Many of the jobs involve some lifting, bending, or stretching.

ELEVATOR OPERATOR

The elevator operator will operate an elevator to transport passengers between floors of office buildings, apartment houses, department stores, hotels, or similar establishments. In addition to running the elevator, he may supply information to passengers, distribute mail to various floors, answer the telephone, prevent unauthorized persons from entering the building, and assist other employees to load and unload freight.

History and Future--More elevator operators will be needed in the next decades as a result of the anticipated expansion in new industrial, commercial, and large residential buildings.

Work Environment--Most elevator operators work a forty hour week. Most operators receive paid vacations, usually one or two weeks a year.

Training and Education--Completion of grade school is required for elevator operators. On-the-job training is offered for most elevator operators.

Qualifications--The elevator operator should have good physical stamina.

Advantages and Disadvantages--Elevator operators on night duty may receive higher wages.

The work is physically demanding.

BARBER

Barbers provide many services related to the care of hair, face, and scalp. They also give hair and scalp treatments. Today we find barbers who style hair and color hair. These specially trained barbers are known as "hairstylists."

History and Future--Several thousand job openings for barbers are expected to arise through the 1970's.

Work Environment--Barbers provide many services related to the care of hair, face, and scalp. Their main task is to cut hair and to satisfy each customer. They may work alone or with other barbers.

Training and Education--Barbers must attend a barber school in order to obtain a license which is required in almost all states. Classes are offered in many public and private schools. Some vocational schools offer training. Courses usually last six to eleven months.

Qualifications--The barber must be able to meet certain health requirements. He must be patient and able to get along with others.

Advantages and Disadvantages--The barber meets many new people.

Barbers who go into business for themselves must have the capital to buy or rent a shop and to install equipment. The barber may be required to stand for long periods of time.

FUNERAL DIRECTOR AND EMBALMER

The duties of the funeral director begin when he is notified of a death. He immediately arranges for the body to be taken to the funeral home. As soon as possible he obtains from the family information necessary for the death certificate, which he will file, and for the obituary notice.

The funeral director discusses with the relatives what type of service and burial they desire. He helps the family in their selection of a casket, vault, and cemetery plot. He advises them on social security, insurance, and other claims if they haven't already sought other counsel on such matters.

The embalmer must know the apparent and positive signs of death. He cleans the body, conforming to the state law on hygiene and public health, and disinfects and preserves it by using certain specified chemicals.

With cosmetics and other materials the embalmer attempts to give the deceased a life-like appearance, then clothes the body and places it in the casket.

History and Future--Well-trained embalmers and funeral directors are and will continue to be needed. It is estimated that at the present time graduates from the accredited colleges supply only about half the personnel needed in funeral homes throughout the country.

Work Environment--Working hours may be irregular, and the funeral director and embalmer must be on constant call. A recent survey indicated that licensed personnel in a funeral home averaged forty-eight to fifty-two hours of work a week.

Training and Education--A high school student can take a number of subjects to give him initial preparation for this field. Biology, chemistry, and physics will help him learn about laboratory techniques and science in general. Social studies, art, public speaking, bookkeeping, business law, and business arithmetic will also be helpful.

Qualifications--One of the most important qualifications is a sincere desire to help people. Courtesy, emotional stability, maturity, tactfulness, sincerity, honesty, and an outgoing personality are marks of the funeral director.

Advantages and Disadvantages--There are several advancement possibilities for the funeral director. He can become first assistant, manager, personnel director, or eventually the owner.

There are a number of positions in a large firm on the professional, supervisory, and managerial levels, and an apprentice or intern can work up to assistant embalmer, embalmer, funeral director, supervisor, branch manager, or manager.

There are certain health hazards in caring for bodies of persons who have had communicable diseases, but with modern facilities the danger of the embalmer contracting diseases is slight.

SHOE REPAIRMAN

The shoe repairman performs many occupations in the shoe shop. He takes off soles and heels and replaces them with new ones. He stitches, staples, trims, and buffs the shoes. He may use prepared dyes or mix his own dyes for shoes and other articles.

The repairman may use several machines and do handwork on a single repair job. When a job is finished, it is carefully marked, and a record is made of the work done and the cost. When the customer calls, the repairman shows him the finished work, wraps it, and receives payment.

History and Future--Today modern shoe repairers take in thousands of dollars for services, such as dyeing, refinishing, and alterations, which were probably unheard of twenty-five years ago. Today, the golden age of shoe repair is just beginning for the man who is smart enough to take advantage of it.

In the long run it seems likely that the demand for skilled repairmen will continue.

Work Environment--The average workweek for unionized workers is forty-four hours. The workweek for self-employed shoe repairmen averages about ten hours a day, six days a week.

The busy seasons in this occupation are spring and fall. January, February, March, July, and August are slack months but extra work is put on during the busy season.

Training and Education--There are no specific educational qualifications for the shoe repairman. However, employers usually prefer to hire high school graduates.

Qualifications--The shoe repairman should enjoy working with his hands and have pride in fine craftsmanship. He should possess manual dexterity, good eye-hand coordination, and health good enough to allow standing all or much of the day. Mechanical ability is also important, since most shops are highly mechanized.

Advantages and Disadvantages--Top men in shoe repairing will find excellent opportunities for promotion to foreman or manager of large shops.

Although shoe repair work is not strenuous, it does require physical stamina. Standing for many workers can result in painful and sometimes serious conditions of the feet, legs, and back.

DRY CLEANING AND LAUNDRY WORKERS

The laundry industry offers a variety of jobs requiring different combinations and levels of experience and education.

The industrial launderers are primarily engaged in supplying laundered clothes, towels, and other items to factories.

Linen launderers primarily engage in supplying to commercial and service establishments or household users such laundered linens as uniforms, aprons, table covers, and towels.

Diaper services supply diapers and other linens for babies to homes.

Rug cleaners repair and clean rugs.

Cleaning and dyeing plants engage in dry cleaning and dyeing apparel and household fabrics.

History and Future--In 1832 a hand laundry was established in New York City for the washing of sailors' clothing and bedding.

The trend toward a higher standard of living forecasts a position of lasting importance for laundries. Fortunately for those choosing the industry as a life's vocation, the business is still in its infancy. The possibilities for expansion and development are vast.

Laundry employment is one of the most stable in the industrial complex.

Work Environment--The normal working time is approximately eight hours per day or forty to forty-eight hours per week. Most employees are given one or two weeks vacation each year.

Laundry processing creates heat and humidity within some working areas, but these are controlled through the use of modern systems of ventilation and air-conditioning.

Training and Education--A young man or woman who has a grammar or grade school education and little or no industrial experience can easily get a start in the laundry industry. Many production jobs require primarily manual skills which can be developed on the job.

Qualifications--Laundry workers should have a knowledge of fabrics, soaps, bleaches, and neutralizers.

Advantages and Disadvantages--Regulations of health departments and the use of proper methods minimize occupational diseases in laundries. Only a few of the total employees in any laundry plant come in contact with soiled clothing. Most employees work with clean and sterilized wash garments or flatwork.

Many laundries offer conventional and special employee benefits. Some of these are rest periods, discounts on laundry work, hospital insurance, pension plans, recreation rooms, plant music, working uniforms, parties, picnics, Christmas bonuses, and low cost meals in company cafeterias.

SERVICE STATION WORKER

The service station attendant spends much of his time pumping gasoline, adding motor oil, and performing courtesy tasks, such as wiping windshields and checking the air in tires. He may also change and repair tires, charge batteries, clean spark plugs, and lubricate, wash and polish cars. Because an attractive station helps business, the attendant is expected to help keep the building, restrooms, and grounds clean and in good order.

An attendant may be required to make road calls with the station truck. He must have sufficient mechanical knowledge to correct minor problems and to start the customer's car.

The attendant uses small hand tools such as pliers, wrenches, and screwdrivers. He may also use power tools and more complex equipment, such as motor analyzers and wheel-alignment machines.

History and Future--Employment prospects for service station workers are expected to increase moderately. There is a high rate of turnover as people leave the field or retire. The number of motor vehicles is expected to increase because of the growing population among those of driving age and those of higher incomes.

Work Environment--Service station attendants usually work more than forty hours a week; many work more than forty-nine hours. This includes weekends and holiday work. Many stations, especially along our nation's interstate highways, operate on a twenty-four hour basis, and attendants may be required to work on rotating shifts. In larger stations employees are paid time and a half for work over forty hours a week.

Training and Education--The major oil companies and dealers that operate large up-to-date service stations prefer that their employees be high school graduates. A high school diploma indicates a knowledge of English and mathematics.

Qualifications--The service station worker should be in good physical condition. His job is an active one that requires bending, lifting, and stooping. He should be pleasant and courteous under all circumstances. He should also be able to keep his temper under control and to give friendly prompt service to all customers.

Advantages and Disadvantages--Entry into the field is fairly simple. The educational requirements are low. Most service station workers are trained on the job; experience usually is not required.

A station attendant gets dirty. Grime and grease accumulate on his hands and clothes as he handles tools and works on cars. Possible dangers are bruised or cut knuckles, burns from hot engines, and falls on oil slicks.

AIRLINE STEWARDESS

The airline stewardess has a public relations job as well as a service job. She is the personal representative of her company and is responsible for the comfort and convenience of the passengers on the airliner. The stewardess also plays an important role in safety functions. She is assigned passenger emergency evacuation duties and has to deal with present day problems of hijacking, bombing threats, and drunken or pugnacious passengers.

The stewardess must report both to the dispatch office and to the aircraft before the plane departs. She must check supplies, adjust ventilation, and check seats for cleanliness before passengers are allowed to board. She may varify and record the names and destinations of passengers and will instruct them in the use of seat belts and oxygen before takeoff and landing.

The stewardess serves meals prepared before the flight by flight kitchens or a catering service, answers questions about the plane or flight, and points out places of interest. She may provide passengers with reading or writing materials. It is also her duty to keep the cabin tidy.

History and Future--Employment will increase considerably during the next decade as the scheduled airlines expand their operations to meet the greatly increased demand for air travel.

The great majority of openings will result from girls leaving the occupation to get married or for other reasons.

Work Environment--The stewardess's work is performed mostly inside the plane cabin, although a few of her duties are performed in and around terminals. A stewardess engaged in international flights performs some duties in foreign stations.

Since commercial airlines operate around the clock, a stewardess's hours of work include night, holiday, and weekend work.

The job offers steady, regular employment and is normally unaffected by seasonal conditions.

Training and Education--All the airlines require high school graduation. Some airlines require that stewardesses have at least two years of college or its equivalent in training and experience. Others specify at least one year of college plus one year of training.

Qualifications--The stewardess must possess poise, charm, a pleasant speaking voice, good health, initiative, and intelligence. She must be unmarried when hired, although divorcees and widows without children are also accepted now by most airlines.

Advantages and Disadvantages--The stewardess has the opportunity to travel and see new places.

The stewardess may be away from home at least a third of the time and may become very lonely in a strange city.

In large commercial kitchens, cooks may specialize in frying, baking, roasting, broiling, or sauce making. Some cooks specialize in the preparation and cooking of exotic, elaborate, or foreign foods. The nature of the cook's job depends partly on where he works.

History and Future--The employment outlook is good for cooks both in the United States and abroad.

Work Environment--Cooks work a forty to forty-eight hour week and may work either day or evening shifts.

Training and Education--A high school education is preferred but not required. Many cooks learn their trade by on-the-job training or through formal apprenticeship which usually last three years.

Qualifications--Hand and finger agility, hand-eye coordination, good memory, and creative talent in working with foods are assets. Cooks must also have a keen sense of taste and smell and be immaculately clean and in good health.

Advantages and Disadvantages--Cooks may advance by moving to other places of employment for higher wages. Successful cooks may become chefs, but this can take fifteen to twenty years.

The work can be strenuous, and cooks most often work near hot ovens and ranges. Much standing is required.

BAKER

The baker makes rolls, breads of all kinds, cakes, pies, pastries, biscuits, doughnuts, crackers, and other types of edible baked foods. He operates the equipment used in bakeries in order to mix ingredients and to divide, form, and bake the products.

The baker must have recipes or formulas to indicate the ingredients to be used. He then selects the flour and other ingredients, such as eggs, milk, sugar, and yeast, and weighs or measures them carefully.

History and Future--According to the American Institute of Baking, about 10,000 bakery workers are needed each year to replace those who retire, die, or leave their jobs for other reasons.

Work Environment--The baker is quite active during his workday. He usually does considerable walking, reaching, stooping, grasping, carrying, pushing, and lifting. He stands most of the day.

Most bakers work eight hours daily, averaging forty hours per week. Bakers owning their own shops work up to sixty or more hours per week.

Training and Education--Those interested in baking as a career should take chemistry, biology, home economics, and business arithmetic in high school. Bookkeeping will be useful for those who plan to go in business for themselves.

Qualifications--The baker should have good senses of taste and smell. He should be willing to work hard and to perform repetitive tasks.

Advantages and Disadvantages--There are possibilities of burns from hot pans and ovens and of heat prostration on hot days. Modern bakeries, however, are often air-conditioned for the comfort and health of the workers.

Public Service

Many persons devote their lives to public service, yet they could have gained far more personal and material benefits had they pursued some other type of activity. For unlike industry, measurements of competence in community service are neither profit-motivated nor production-oriented. Finally, being service-involved demands a commitment to the task as well as to the society, and those personal commitments may distinguish the dedicated public servants from all other workers.

CITY MANAGER

The city manager's duties are varied and demanding. He must see that all laws and ordinances are enforced by the proper department of the city government. He exercises control over all the departments in planning, directing, coordinating, and reviewing the services they perform for the community.

The city manager impartially appoints, supervises, and removes department heads and other employees. He prepares the annual budget for all departments and informs the council of the city's financial condition and future needs for money. The council may request the city manager to make certain regular or special reports. He is expected to attend all council meetings.

The city manager must keep in touch with the people of the community and maintain friendly relations with them.

His recommendations and management decisions must be made with care, so that he cannot be accused of favoring any group or individual as he functions in his job.

History and Future--The council/city manager idea was born in Staunton, Virginia in 1908 when the council decided to experiment in the supervision of city affairs. Today, the council/manager plan is used in over half of all United States cities where the population ranges between 10,000 and 500,000.

More opportunities for women are becoming available in city government. Although the position of city manager is considered a man's job, women are often employed as assistant managers and administrative assistants.

Work Environment--The manager does not have a nine-to-five schedule. He may report to his office at nine with hopes of getting through at five, but this frequently is impossible. Many managers put in more than fifty hours a week, without overtime pay. Inspection trips and the conduction of city business often take him away from his office.

Training and Education--Increasingly, the trend is toward city managers who have a bachelor's degree and preferably a master's degree in public administration.

College courses should include political science, history, economics, statistics, sociology, psychology, English, and speech.

Qualifications--The business manager must be able to combine business judgment, initiative, technical knowledge, and the ability to handle people.

He must be able to communicate to all social and economic levels and to all creeds and races in the community.

Advantages and Disadvantages--The position of city manager carries great responsibility. The hours may be long, with weekend duties frequent. There is no overtime pay, but salaries are higher than in other areas of government. Fringe benefits usually are good.

The high professional standards set for city managers offer challenges and rewards. The city manager with a deep devotion to public service and a talent for community leadership will find satisfaction in his work.

POLITICAL WORKER

The two major American political parties, the Democrats and Republicans, work through committees set up at all levels from local to national. Minor parties may follow a similar plan, although not necessarily on a nationwide basis; they might concentrate only on elections in connection with local issues and candidates.

During a campaign the political worker visits registered voters in his district, explains the qualifications of his party's candidates, and distributes campaign literature. Between campaigns he may visit new residents in the district to persuade them to register. He tries to learn what problems concern the voters in the precinct and how his party can be of service to them. He helps the voters in their dealings with the government, advising them on how to get tax adjustments, health services, and other aid.

Often a precinct leader has a full-time job working in some capacity for the state or local government, although civil service regulations in some localities prohibit political activity by civil servants.

Some political jobs are available shortly before or on election day. Special clerks are employed to help register new voters and to assist at the polls by checking in voters and giving information.

Other political jobs are those of election judge and clerk. They work in the polling places during registration periods and elections.

History and Future--The future of America politics rests to a large extent on the quality of the men and women who choose to work in this field, those who do the volunteer jobs, who work behind the scenes, or who actually run for office. A democracy is not effective unless its people participate in it, and so participation of all kinds--volunteer, professional, advisory--is important.

Work Environment--The political workers either work for national or local political parties.

Training and Education--High school courses should include political science, history, economics, and a thorough study of American history.

Qualifications--Political workers must have the ability to choose able people to assist them. They must know how to organize them and to keep the team working together smoothly and efficiently. This ability to keep people working together is essential at all levels of politics.

Advantages and Disadvantages--A person should not count on earning a living from politics alone at the beginning. A career in another field, which may be a springboard into politics, is a must.

HISTORIAN

Most historians work in colleges and universities where they engage in a combination of teaching and research. Some work in politics or journalism.

History and Future--Employment opportunities, especially in college teaching, are expected to increase rapidly during the next decade.

Many private industries hire college graduates who have majored in history as trainees for administrative and executive positions.

Work Environment--Historians are employed throughout the nation wherever colleges and universities are located. Historians employed by the federal government are located in Washington, D.C. Historians specializing in collecting historical documents are employed in the larger metropolitan areas.

Training and Education--A bachelor's degree is required for a beginning historian. The master's degree is the minimum requirement for an appointment as a college instructor.

Qualifications--The historian must be able to obtain historical facts and have the ability to interpret and analyze historical data.

Advantages and Disadvantages--Historians with only a master's degree, who desire college-level teaching positions, may find competition for available positions exceedingly keen. College graduates with only a bachelor's degree will very likely have an extremely difficult time finding employment as historians.

The best employment opportunities with the highest starting salary will be available to those historians who have earned their doctorate.

GEOGRAPHER

The geographer conducts research concerning the nature and use of the earth's areas, the distribution of natural resources, and the activities of people in various regions. He directly observes the physical and cultural aspects of the area under study and analyzes economic activities, racial distribution, transportation systems, and political organizations. The geographer uses available knowledge and methods taken from other scientific fields to make studies and analyses of soils, vegetation, climate, terrain, and mineral and water resources.

History and Future--The demand for professional geographers is expected to be good through the 1980's. Greater opportunities in research and teaching await those with advanced training.

Work Environment--The geographer may perform tasks outdoors or in offices or laboratories. Outside work is affected by climate. Some geographical studies may be made in areas where living and working conditions are primitive and barely adequate.

Training and Education--The minimum requirement for a career in geography is a bachelor's degree with a major in geography.

For most beginning research and teaching positions, the master's degree is required. The Ph.D. degree is usually essential for high level posts in college teaching and research.

Qualifications--The geographer should have a broad interest in people and their surroundings, a good imagination, an inquiring mind, and the ability to get along well with others. Good health is desirable since travel and poor living conditions may be involved.

Advantages and Disadvantages--Many geographers increase their earnings by doing consulting work, by writing articles and books for publication, and by doing special research on a fee basis.

The working hours are often irregular and will vary according to the geographer's specialization.

SPEECH AND HEARING CLINICIAN

The clinician works with children or adults who have some kind of speech or hearing problem.

The clinician also works with children who stutter, who have had cerebral palsy, or who have suffered brain damage. He works with adults who have severe physical disabilities or who must learn to talk all over again after illness or accident.

The exact duties of the clinician vary with the kind of speech problem and the age of the person.

History and Future--During and after World War II many new techniques were devised to aid servicemen who had suffered speech or hearing injuries. Advances in modern electronics have also contributed greatly to research and treatment.

In recent years the field of speech therapy has become more attractive to young men and women, especially since salaries have improved. Numerous openings in research, teaching, administration, and in corrective work are available to exceptional people.

Work Environment--The speech and hearing clinician works in elementary and secondary schools. The clinician is also qualified for positions in hospitals, rehabilitation centers, and clinics where speech and hearing therapy is offered.

Training and Education--A college degree is always required in this field, and the speech and hearing clinician should expect to continue training beyond the bachelor's degree.

High school and college courses in public speaking, dramatics, and singing are sometimes helpful in preparing for this career.

Qualifications--The clinician needs a warm, friendly personality to inspire confidence in his patients. He should enjoy helping all kinds of people and should be able to work as part of a professional team.

Advantages and Disadvantages--Advancement opportunities are excellent. Clinicians in hospitals and universities may rise to supervisory posts or take on administrative duties. Speech and hearing therapy can be difficult and tiring. Often speech rehabilitation can take a long time.

DRIVING INSTRUCTOR

The instructor in the driver training school uses one of the school's cars, which is equipped with dual brakes. He often calls for the student at his home and then begins a very carefully worked out plan of instruction.

Most schools have an outlined series of driving steps that should be followed with each student. Some students omit the classwork, however, and begin their lessons in the automobile.

The instructor begins with the instrument panel and safety aids of the car; he teaches such things as proper position before the wheel, use of the controls, gearshift positions, adjustments made before and after starting and stopping the car, backing, making turns, maintaining and changing lane position, and angle and parallel parking.

History and Future--The outlook for driving instruction is constantly improving. About thirty states have enacted laws and regulations to govern driver training schools and instructors.

There are also opportunities in traffic safety work. One can specialize in driver education, traffic regulations and control, or publicity for safety programs.

Work Environment--The winter season is the slack period for driving schools; driver instruction does not include learning to drive on snowy and icy streets. In the north an instructor may be fortunate to work thirty hours a week during the winter. However, the other seasons are very busy and he may work twice as long.

Training and Education--A beginning instructor must be at least twenty-one years of age and must have a high school diploma. He is also required to be an expert driver.

The National Commission on Safety Education recommends that a prospective teacher for the school driver education program have a bachelor's degree from an accredited institution with a minor or it's equivalent in safety education.

Qualifications--The instructor must be able to get along with people. He must be calm, friendly, and positive and direct in his approach; he also must be patient.

Advantages and Disadvantages--After a person has been a driving instructor for a while, he may decide to open his own driving school. There are many communities throughout the United States where there are ample opportunities for new schools. A good school with strict regulations, well trained instructors, and a reputation for honesty in its dealings with students will have all the business it can handle.

POLICEWOMAN

The policewoman is often assigned to deal primarily with one area of law enforcement, such as the youth division, the missing person's bureau, or perhaps a special female division.

One of the main functions of policewomen is the prevention of crimes against women and children. They deal also with cases where women and minors are the offenders. The policewoman may also work along with men in the department to identify and arrest swindlers and thieves who prey particularly on women.

In some small cities, policewomen spend a part of their time doing clerical work for the department.

History and Future--Matrons to supervise female prisoners were employed as far back as 1845, but it was not until 1910 in Los Angeles that the first woman was permitted to join a police force and assume police duties.

The future for women in law enforcement looks bright. Even now, there are vacancies for trained women on the staffs of many large police departments, and as more cities recognize the unique contributions that policewomen can make, there will be more opportunities.

Work Environment--The policewoman often carries a gun and handcuffs. For patrol duty, and in certain other circumstances, she operates an automobile.

The policewoman may work under all kinds of conditions as she trails a suspect in an effort to gain evidence or to apprehend a criminal.

While the women on the police force may at times be in physical danger, the on-duty fatality rate for policewomen is quite low.

Training and Education--In most cities, policewomen must have at least a high school education. A college education is of great help, both in obtaining work as a policewoman and in gaining promotions.

Qualifications--A policewoman should have good moral character and have a sense of responsibility. She must be interested in people, patient, understanding, emotionally stable, and even-tempered, especially when under stress.

Advantages and Disadvantages--Policewomen generally have excellent job security and find a good deal of job satisfaction in their work. They perform a public service, protecting some of the more vulnerable members of society. They deal with the public most of the time, and new situations are constantly arising; therefore, the work offers a great deal of variety.

FIREMAN

Firemen must be prepared, at a moment's notice, to rush to a fire and handle any emergency that occurs. Firemen must perform specific jobs assigned to them by their commanding officer. They may have to connect hoses to hydrants, position ladders, operate a pressure pump, or drive the truck. Often, firemen will have to administer first aid and other emergency treatments.

Educating the public about fire prevention and safety measures is another important duty of the fireman.

History and Future--Up until modern times, bucket brigades were the chief means of fighting fires. Now, fires are fought with new and modern equipment.

The number of firemen is expected to increase rapidly to meet the needs for fire protection in growing urban communities.

Work Environment--The fireman works outdoors in all kinds of weather, in rain, snow, freezing or scorching temperatures, hurricanes, or earthquakes.

When the fireman is indoors, his office is a simple but clean, well-lighted, and well-ventilated firehouse. Many firehouses have recreational equipment that the men may use when they are not at work.

Training and Education--A high school education is required by most fire departments. Much of the training is done on the job.

College and technical schools offer courses in fire fighting.

Qualifications--Good eyesight and hearing are important in this occupation. The fireman must be courageous, calm, quick, alert, and must be able to work well as a member of a coordinated team.

Advantages and Disadvantages--A fireman's duty keeps him away from home for longer periods than many other kinds of work do. All fire fighters are subject to the discipline required in this almost military occupation. Employment is steady and not affected by economic conditions.

Sick leave and injury benefits for firemen are better than average. Men hurt while on duty usually receive full pay while convalescing, plus compensation for medical care. If permanently injured, they are retired at half pay or more.

POSTMAN

Most postmen travel predetermined routes delivering and collecting mail from street letter boxes and from office chutes. Others drive trucks and deliver parcel post. Some deliver and collect mail along routes usually located outside the city limits. Rural carriers may sell stamps and money orders and accept parcel post letters and packages to be registered or insured.

History and Future--In early America, ships were the only means of transporting mail. When America began to grow, railroads, stagecoaches, and the pony express took the mail to the different towns. In our day and age, we find mail being sent by railroads, airplanes, and trucks.

The future employment for postmen is good. The post office department plans on hiring more employees year after year.

Work Environment--Postmen work all over the country in cities, towns, villages, and rural areas. Some may work inside a building, delivering the mail to the different offices found in the building. If a postman works in a rural area, he may have to drive many miles a day on his route.

Training and Education--A high school education is the minimum requirement. The beginning postman is provided with on-the-job training.

Qualifications--The postman must be a citizen of the United States, be able to follow orders, have a stable character and memory, be in good health, and have good vision.

Advantages and Disadvantages--The postman is paid by the United States government.

The job is open to both men and women.

The postman receives vacation days each year, along with sick leave days. Retirement plans are good and the postman is usually assured of steady employment.

Although the postman may find this work unpleasant due to adverse weather conditions and to the energy required, he may advance in his field to a higher position if he has had a great deal of experience, special training or education, and certain other abilities.

POSTAL CLERK

The duties of a postal clerk vary according to the size of the post office in which he is employed. In a small post office he is known as a distribution and window clerk, and he sorts mail as it comes in or goes out. He also tends a window, selling stamps or weighing packages. In large post offices, the work is more specialized because the mail is handled by multi-position letter-sorting machines.

History and Future--Ever since the need arose for communication between distant points there has been some form of postal service. At first it was used solely for military purposes.

In the United States, the first colonial services were privately operated. Postage stamps were introduced in 1847 and home delivery of mail was begun in 1863. To speed and improve mail handling, the Zoning Improvement Plan (ZIP code) was initiated July 1, 1963.

The employment outlook for postal clerks is reasonably good. There will be many thousands of job openings in the next decade, most resulting from the need to replace clerks who transfer to other occupations, retire, or die.

Work Environment--Most post offices are modern, bright places in which to work. There is much contact with fellow employees and with the public to add interest to the job. Post office jobs in small communities compare favorably with other jobs offered locally. Full-time clerks work a fixed five day schedule, which constitutes a forty hour workweek.

Training and Education--A high school education is helpful.

All applicants must pass a U.S. Postal Service examination, which includes tests of English, arithmetic, and general knowledge.

Qualifications--Good health and a good memory are essential for a postal clerk.

Advantages and Disadvantages--The postal service offers retirement benefits, sick leave, and disability benefits. Employees can also receive low-cost insurance as well as compensation if they are injured in the performance of their duties.

Postal service jobs are not affected by the business cycle. The labor-management contract has a no-layoff clause as a primary source of security.

SANITARY ENGINEER

The sanitary engineer specializes in many areas. One of the most important areas is refuse collection and disposal.

The work of the sanitary engineer is not routine; he faces many new challenges that are a result of modern technological accomplishments. These challenges include the health problems of hastily built suburbs, the pollution of water and air by new chemicals and radioactive wastes, accident prevention, pesticides, toxicity and food, and water supply development. To meet these challenges, the work of the sanitary engineer has become more specialized.

History and Future--The future for sanitary engineers appears to be excellent. The normal growth of population is expected to provide many opportunities. There is a need for sanitary engineers who have a good knowledge of ecology. There are also opportunities for women in the sanitary engineering field, though at present not many are employed in it.

Work Environment--Almost half the nation's sanitary engineers work for government agencies, particularly the U.S. Public Health Service, Federal Water Pollution Control Administration, U.S. Army Medical Service Corps, U.S. Navy Medical Services Group, U.S. Air Force Biomedical Corps, and various state health departments. Some are employed by municipal governments. Twenty-five percent are in business or industry as independent consultants or employees of private companies. Some work for American oil and mining companies overseas, helping to set up housing facilities for workers there. Some sanitary engineers are teachers.

Training and Education--In high school the prospective sanitary engineer should take as many science courses as possible. English, mathematics, social studies, history, and foreign language will also be helpful. At this time he should try to talk to a sanitary engineer about his plans. Consulting engineering department personnel of a college, preferably the one he expects to attend, would also be advantageous.

Qualifications--The sanitary engineer should have good mechanical aptitude and should enjoy working with detail. He should be in good health and not mind traveling extensively and roughing it when necessary.

Advantages and Disadvantages--Teaching and research positions usually require the applicant to have a doctor of philosophy or doctor of science degree, which takes another one to three years of schooling after the master's. Graduate students especially will find financial help available to them in the form of fellowships and traineeships from industry foundations, the U.S. Public Health Service, and sometimes the college itself.

PUBLIC UTILITY WORKERS

The watch engineer is the main supervisory worker. He oversees the men who are responsible for the operation and maintenance of equipment and machinery.

The switchboard operator works in a control room and directs the flow of electric current from the generators to the outgoing power lines. He must keep a constant check on his instruments to see that the electricity is moving properly through the power plant and that the correct voltage is maintained.

The auxiliary equipment operator regulates and tends pumps, fans, and blowers, as well as a variety of other equipment in steam plants.

The load dispatcher is the nerve center of the utility network. He gives the orders to start or shut down boilers and generators at the station.

The linemen build and repair power lines that bring electricity to homes, stores, factories, and schools. They are often needed to splice or replace broken wires and cables.

The troubleman goes out to locate the source of the difficulty and to make the necessary repairs or adjustments.

History and Future--There has been a growing demand for natural gas energy, giving an excellent long-term employment outlook.

Work Environment--The utility industry offers steady and secure work. Layoffs are rare. Some companies employ college students for temporary summer help, mainly on outside jobs.

Training and Education--Most jobs in the utility industry require a high school education. Subjects that will be especially helpful are mathematics, science, and English. Some jobs will require business arithmetic.

Qualifications--Mechanical aptitude, manual dexterity, the ability to get along with others, and a willingness to learn are important qualifications.

Advantages and Disadvantages--Utility companies provide paid vacations and holidays, pension plans, and group life insurance, as well as hospitalization and medical insurance programs.

Since electricity can be dangerous, utility companies enforce strict safety standards. Frequency of accidents per man-hour in the electric light and power industry is below that in most manufacturing industries.

PUBLIC PERSONNEL WORKER

The public personnel workers deal with employees of federal, state, and local government agencies such as park districts, schools, and turnpike administration.

Personnel workers in civil service work on job analysis, wage and salary classification, interviewing, giving the civil service examination, and placing workers in the right job.

Labor relations in the field of public personnel have been changing in recent years, as there has been a growth of union strength among government workers. Dealings with labor unions will probably continue to become more important in public personnel.

History and Future--Expansion of employment in personnel work is expected during the next few years as the nation's employment rises. Job opportunities for college graduates with specialized training in the field will be greater than for young people seeking advancement into personnel work from production, clerical, or other sub-professional jobs.

Work Environment--Personnel workers generally work in comfortable surroundings. The hours are fairly regular, varying from thirty-five to forty hours a week.

Personnel workers, like those in most professional fields, may put in time after working hours studying or attending professional conferences.

Training and Education--Today, a college degree is necessary for entrance into personnel work.

In choosing college courses, one must keep in mind that personnel work deals with people and companies. To deal with people, it is necessary to study the social and behavioral sciences, especially sociology, psychology, and social psychology. Courses in business and economics are important for understanding the company and its policies.

Qualifications--The personnel worker must be able to work with people of all levels of intelligence, education, and ability. In interviewing and counseling, he must be able to meet people, talk comfortably with them, and at the same time size them up for the job he is trying to fill. He must be able to remember details, the special qualifications of a certain employee, and the special needs of a certain job.

Advantages and Disadvantages--Women personnel workers, who make up about one-fourth of all the people in the field, have a better chance of finding jobs in companies that have many women employees.

Generally, personnel workers receive the same benefits as the other employees in the organizations where they work, such as paid vacations, insurance, hospitalization, and retirement programs.

INDUSTRIAL AND LABOR RELATIONS WORKER

Workers in industrial relations work with individual employees in areas such as selection, training, retraining, transfer, promotion, and retirement. They may also work in labor relations, which is usually carried on with groups of employees.

The industrial relations worker may serve as an employment interviewer or assistant to the personnel manager, a safety director who must interpret company policy to the labor force, and, in turn, communicate labor's problems to management.

History and Future--Many opportunities await qualified applicants in the field of industrial and labor relations. The entire job area is expanding very rapidly.

Work Environment--Industrial relations workers are employed in local school systems, colleges and universities, government agencies, and hospitals.

Training and Education--The industrial labor relations worker must have a college education. He might take a degree in personnel administration, business administration, economic psychology, or some related subject. College studies in labor law, organization, administration, collective bargaining, labor economics, industrial psychology, sociology, history of unions, communications skills, counseling, and public administration will prove of special value to the prospective worker in the industrial relations field.

Qualifications--The industrial relations worker is a specialist in manpower. Therefore, he must be able to think independently and to analyze the factors that affect a worker's morale, enthusiasm, and ability to do his job.

Advantages and Disadvantages--The pressure can be severe, and during periods of cris long hours and even work around the clock can be expected. However, industrial relations workers say that the rewards of the occupation in terms of personal satisfaction far outweigh the disadvantages. The work is especially attractive to men and women who derive satisfaction from creating harmony between people of opposing views through compromise and ultimate agreement.

SOCIAL WORKER

Social workers provide the link between various services and the individuals and families who are unable to provide for themselves or who need assistance in solving their problems.

The problems which concern social workers include poverty, broken homes, physical, mental, and emotional handicaps, antisocial behavior, racial tensions, unsatisfactory community conditions, housing, medical care, and lack of educational, recreational, and cultural opportunities.

History and Future--Many factors will contribute to the need for more social workers to maintain existing programs and to staff new ones. Many openings also will arise because of the need to replace workers who retire, die, or otherwise leave the profession.

Work Environment--Hours and working conditions vary widely. The workweek of many social workers is 37 1/2 hours; some public agencies have a forty hour week. Overtime, night, and holiday work are not unusual.

Training and Education--A bachelor's degree, preferably in social welfare, generally is the minimum educational requirement for beginning jobs in social work. For teaching positions, a master's degree in social work is required and a doctorate is preferred.

Qualifications--Personal qualities essential for social workers include emotional maturity, objectivity, sensitivity, a basic concern for people and their social problems, and the ability to form and sustain good working relationships and to encourage social adjustment in others.

Advantages and Disadvantages--Promotion can be quite rapid in social work. If the worker is willing to study and give even a little more than the basic job requires, he may find he has more and more responsibility. Eventually, by demonstrating his competence, he may be admitted to the Academy of Certified Social Workers, a unit of the National Association of Social Workers, and may assume the responsibility of a self-directed practitioner.

LAWYER

Most lawyers are engaged in general practice, handling all kinds of legal work for clients. However, a significant number specialize in one branch of law, such as corporation, criminal, labor, patent, real estate, tax, or international law. Some attorneys devote themselves entirely to trying cases in courts. Others never appear in court but spend all their time drawing up wills, trusts, contracts, mortgages, and other legal documents; conducting out-of-town negotiations; and doing the investigative and other legal work necessary to prepare for trials. Some are primarily engaged in teaching, research, writing, or administrative activities.

History and Future--Law is as old as civilization. It grew out of a need for rules that would help men live together harmoniously. At first, it was little more than custom, but gradually precedents were established; out of these came formal written laws.

Graduates from widely recognized schools and those who rank high in their classes will have very good employment prospects. They are expected to have good opportunities for obtaining salaried positions with well-known law firms, on the legal staff of corporation and government agencies, or as law clerks to judges.

Work Environment--Lawyers practice in all parts of the country; the concentration of lawyers is greatest in cities and in the states which have the greatest population.

Training and Education--Seven years of full-time study after high school is necessary to complete the required college and law school work. The usual preparation for becoming a lawyer is four years of college study followed by three years in law school. However, many law schools admit students after three years of college work. A few schools may accept students after two years of college work.

Qualifications--U.S. citizenship and sound moral character are required to practice law in the United States.

Advantages and Disadvantages--The private practitioner enjoys a sense of free enterprise and independence. Law has no set retirement age, and many practice well into their seventies. Physical handicaps are no drawback. The established lawyer usually enjoys the respect of the public and considerable prestige.

A person may be unhappy in the legal profession if he is unable to stand up under pressure. Some might find the work confining or tedious. The need for lifelong study to keep abreast of developments in the field puts constant pressure on the lawyer.

Transportation

In any society transportation is necessary for survival. In an industrial society an effective system is vitally necessary. The need for an effective system of transportation will continue to grow as the nation's economy expands. While modes will change over the years with the increased usage of air cushion vehicles and aerospace devices, the field will continue to offer varied and challenging career possibilities.

TRUCK DRIVER

The truck driver spends most of his time behind the wheel; the long distance truck driver must practice safe driving techniques. Defensive driving, anticipating the unpredictable behavior of pedestrians and of other drivers and the effects of changing weather conditions, is absolutely essential. At all times truck drivers must obey speed regulations, watch for streets or roads closed to heavy traffic, and have their vehicles under full control.

At the start of each trip, he reports to the dispatcher for his instructions and his bill of lading, the papers describing the nature and weight of the cargo he is to carry. He then carefully checks the tires, oil, water, and fuel and makes certain that the load is secure.

The driver is required to keep a daily log book of his stops, route, and driving hours for the Bureau of Motor Carrier Safety in the U.S. Department of Transportation and Federal Highway Administration.

History and Future--The job outlook for long-distance truck drivers is bright. Some increase in the number of jobs for truck drivers is expected as a result of several factors, among them the expansion of industrial activity, the widespread movement of industries from larger cities, and the continuing mobility of population.

Work Environment--A truck driver is not permitted to be on the road for more than ten hours, after which he must be off for eight hours. He may not have a total of more than fifteen hours of driving and other duties without eight hours off. He is limited to sixty hours in any seven day period or seventy in any eight consecutive days.

Training and Education--Some trucking companies will accept drivers with an elementary school education; others require at least two years of high school and prefer men with a high school diploma.

Qualifications--The truck driver must be at least twenty-one years of age, with good hearing and at least 20/40 vision with or without corrective lenses.

He must have sufficient command of the English language to understand traffic signs, converse with the public, and complete necessary reports.

Advantages and Disadvantages--Benefits are good. Vacations of one to five weeks are common, depending on the length of service. Some companies also offer meal allowances, insurance programs, and company-paid pension plans. Some truck drivers can earn bonuses for special loads; some receive layover expenses.

The tension of sustained driving and the constant pressure associated with driving safely and on schedule in difficult weather conditions and heavy traffic can produce a considerable strain. Too, drivers are often required to work holidays and weekends and must frequently be away from home for several days at a time.

DISPATCHER
(TRUCKING INDUSTRY)

The dispatcher coordinates the movement of trucks and freight into and out of terminals, makes up loads for specific destinations, assigns drivers, develops delivery schedules, handles customers' requests for pickup of freight, and provides information on delivery.

History and Future--Employment in the trucking industry is expected to grow rapidly through the 1970's. New jobs resulting from employment growth, as well as jobs that must be filled as experienced workers retire, die, or transfer to other fields, are expected to account for tens of thousands of openings each year.

Work Environment--The dispatcher's work is not physically strenuous. The dispatching areas are well lighted, heated, and ventilated.

Training and Education--Most employers prefer high school graduates. New employees work under the guidance of experienced workers and foremen while learning their jobs. This usually takes no more than a few weeks.

Qualifications--The dispatcher must be in good physical condition. He must also be able to read and speak English.

Advantages and Disadvantages--Dispatchers who demonstrate supervisory ability can become gang leaders or dock foremen.

MOTORCYCLE MECHANIC

The motorcycle mechanic finds the cause of a major mechanical or electrical problem on a cycle and then makes repairs quickly.

The mechanic first discusses the problem with the owner of the cycle and then runs the engine or test rides the machine. Once the defective parts are located, the mechanic repairs or replaces them. Some jobs require only the replacement of a single item such as a carburetor or electric starter and may be completed in less than an hour. In contrast, it may take several hours for the mechanic to overhaul an engine because he must disassemble and reassemble it in order to replace worn valves, pistons, bearings, and other important parts.

Mechanics use common handtools such as wrenches, pliers, and screwdrivers, as well as special tools designed for working on hard-to-remove parts such as flywheels and bearings. They also use compression gages, timing lights, and other testing devices. Hoists are used for lifting heavy motorcycles.

Most mechanics are expected to perform all kinds of repairs on motorcycles.

History and Future--Because the number of motorcycles on the road increased by about 300 percent between 1960 and 1970, employment in this occupation is expected to grow rapidly.

Many cycles are purchased to beat the high cost of transportation and parking. The cycle, like its four-wheeled counterpart, the automobile, requires periodic servicing.

Work Environment--Motorcycling activity increases sharply as the weather grows warmer. Consequently, during the summer most mechanics work more than forty hours a week.

Training and Education--Most employees prefer to hire high school graduates but will accept applicants with less education. High school or vocational school courses in small engine repair generally strengthen an applicant's qualifications, as do courses in automobile mechanics, science, and mathematics.

Qualifications--Trainees must have mechanical aptitude and show an interest in learning the work. Trainees must be free of any physical disabilities that would prevent them from obtaining a motorcycle driver's license.

Advantages and Disadvantages--Many employers of motorcycle mechanics provide holiday and vacation pay and additional benefits such as life, health, and accident insurance. Some also provide paid sick leave, contribute to retirement plans, and furnish laundered uniforms free of charge.

Although the work is not hazardous, mechanics sometimes suffer cuts, bruises, and other minor injuries.

TAXICAB DRIVER

The taxicab driver's job is transporting people. Delivering packages and performing a sightseeing service for those who request it are also in a day's work for him.

Cabdrivers have a number of ways of getting customers. The most common one in large cities is to pick up people on the street.

Some drivers use two-way radios to obtain most of their customers. When the dispatcher receives a call for a cab at a certain address, he radios the locality to his fleet. Cabs operating in the vicinity radio in their bids for the call, and the cab closest to the address is assigned to pick up the passengers.

Many companies have stations where cabs wait in line, either to pick up passengers directly or to be sent out on calls. Some drivers wait at cabstands strategically located in busy areas of the city or near theaters, hotels, railroad stations, or airports. Some cabstands are equipped with telephones that the dispatcher uses to send drivers out on calls.

History and Future--The service of transporting people is not new, and the idea did not originate in the United States. Japan has used the jinrikisha (a two-wheeled carriage pulled by a man) for hundreds of years. Ancient Rome had chariots and drivers for hire. Carriages or cabs drawn by horses have been common in large cities throughout the world for many years and still are used in some cities for drives in parks.

There has been a steady increase in the number of taxicab companies, taxicabs, and drivers in the suburban communities and smaller cities.

Work Environment--Cab drivers enjoy the freedom to organize their work pretty much as they want as long as they do enough business. However, the life is not an easy one. Many drivers have been robbed or injured by hoodlums posing as passengers. Drivers complain that some people call a cab and then leave before the cab can get to the address. Drunks may joyride without money to pay for the trip; passengers who refuse to pay the fare are not uncommon. Others may not tip.

Training and Education--A high school education is preferred. This education will help in handling finances and often gives a person confidence in talking with passengers. A high school diploma is almost essential for a driver who plans to have his own cab company. He must be able to run his business profitably, figure the earnings of those working for him, and fill out tax and insurance forms.

Qualifications--The most important requirement is the ability to drive extremely well. A beginning cabdriver should have at least three years of driving experience.

Advantages and Disadvantages--Most cabdrivers receive a percentage of their total fares, usually between forty and fifty percent. Some companies pay a small salary plus a commission based on the volume of business the driver does.

Besides the strain of being behind the wheel for long hours each day, driving in bad weather and rush hours add extra tension. Accidents are surprisingly few considering the number of miles driven, but many accidents count seriously against the driver's record.

TRACK WORKER

Trackmen construct, maintain, and repair railroad tracks and roadways. Many work in section crews which patrol a limited section of the railroad's right-of-way. Other track workers are employed with highly mechanized crews to cover longer stretches of the right-of-way. Still others are employed in "extra" crews performing seasonal maintenance and repair work, such as replacing rails.

After some track workers make regular inspections of the right-of-way, trackmen and portable equipment operators make necessary repairs. Roadway maintenance machines, such as multiple tie tampers, power wrenches, and ballast cleaners, have been displacing gradually the use of such handtools as picks, shovels, and spike hammers. In place of trackmen using hand or pneumatically-powered tools, more and more railroads are using roadway machines which require skilled operators.

History and Future--Several thousand new workers will be hired each year in track maintenance occupations, mostly for the seasonal rush during the summer months. Comparatively few openings will offer steady year-round employment.

Work Environment--Since most section men inspect and maintain only a few miles of track, they usually live at home.

Most trackmen work a five day, forty hour week. Time worked over eight hours a day is paid for at time and one-half rates.

Training and Education--Most track workers are trained on the job. To acquire the necessary skills requires up to two years. Machine operating jobs are assigned to qualified trackmen on the basis of seniority.

A high school education is desirable to advance to portable equipment operator and gang foreman.

Qualifications--Most railroads prefer workers between the ages of twenty-one and forty-five who must be able to read, write, and do heavy work. Applicants often are required to take physical examinations.

Advantages and Disadvantages--Trackmen who have the necessary seniority and qualifications may advance to gang or assistant foreman, then to a supervisory maintenance position, such as track supervisor.

Supervisors usually travel from place to place, generally living in camp cars or trailers provided by the railroad and paying for their own food.

LOCOMOTIVE ENGINEER

The engineer is responsible for running the locomotive safely and efficiently. He operates the throttle, air brakes, and other controls, and he supervises the work of the fireman (helper) who may work in the cab with him. Engineers work in railroad yards or on the road in passenger or freight service. The engineer in passenger or freight service operates the locomotive which moves trains over the road according to the train orders for each run or any instructions received en route through the conductor, the wayside signal system, or by train radio.

Before and after each run, the engineer checks on the condition of the locomotive and either sees that minor adjustments are made on the spot or reports to the engine foreman mechanical defects needing attention.

History and Future--Openings will arise from the need to fill positions left vacant by engineers who retire, die, or otherwise leave the occupation.

Work Environment--The engineer often is scheduled to work nights, weekends, and holidays at straight-time rates. Like other workers in road service, he must often lay over at the end of a run before he makes the return trip to his home terminal.

Training and Education--The applicant must pass comprehensive examinations on the train's mechanical and electrical equipment and on fuel economy, safety, timetables, train orders, and other operating rules and regulations. He also must be able to operate any kind of locomotive in service on his road.

Qualifications--Locomotive engineers must have good eyesight, hearing, mechanical ability, and eye coordination. They should be able to concentrate on detail in order to operate the complicated control system of a locomotive.

Advantages and Disadvantages--A newly promoted engineer starts out as an extra board man without any regular assignment. It may be several years before he receives such an assignment. During this period, he works on temporary assignments whenever an engineer is needed. An experienced engineer may advance to a supervisory position, such as foreman of engines for his road.

CONDUCTOR
(RAILROAD INDUSTRY)

The conductor is responsible for seeing that railroad trains are moved according to train orders or other instructions. Freight and passenger train conductors are the "captains" of their trains. They are responsible for the safety of their passengers and cargoes, and they supervise the work of the train and engine crews.

Before a freight or passenger train leaves the terminal, the conductor receives the train orders from the dispatcher and confers with the crew members to make sure they understand the orders. As the superior officer on the train, the conductor takes charge in any emergency that may occur while the train is on its run. All persons employed on the train are subject to his instructions.

On freight trains the conductor keeps a record of the contents and destination of each car and sees that freight cars are picked up and set out along the route. On passenger trains, the conductor collects tickets and cash fares.

History and Future--Conductors are one of the oldest age groups in the nation's work force and job openings will develop to replace those who retire, die, or leave railroading for some other reason.

Work Environment--Conductors in freight and passenger service often are scheduled to work nights, weekends, and holidays. Conductors on extra board work often have irregular hours. They also may work less time than conductors with regular assignments and, therefore, earn less.

Training and Education--Openings for conductors are filled on a seniority basis by promotion of qualified brakemen. To qualify for promotion, a man usually must have several years of experience as a brakeman and pass examinations covering signals, air brakes, timetables, operating rules, and related subjects.

Qualifications--The conductor must be able to act effectively as the railroad's representative. Conductors who show special ability of this kind may advance to managerial positions, such as trainmaster.

Advantages and Disadvantages--Conductors are often required to work nights, weekends, and holidays. Many are required to work away from home for days at a time.

PILOT

An airline pilot's pay is high, but the requirements are strict and the responsibilities are great.

The pilot's work includes preparing the airplane for flight and takeoff, including current and forecast weather en route and at the intended point of landing, and filing a flight plan.

Before a pilot takes off, he familarizes himself with the weather along his line of planned flight; he checks latest radio procedures and alternate airport conditions in the event he cannot fly to his original destination. He files his complete flight plan and is ready to check his airplane.

As the pilot prepares to start a trip he or the copilot inspects all parts of the aircraft, including instruments and controls. In scheduled airline and large corporate aircraft operation, a Federal Aviation Administration approved checklist is used for each phase, uch as before starting engines, before takeoff, and during takeoff. At the start of each engine, he checks all its gauges to see that they are functioning properly and then starts the next engine using the same procedure each time.

He obtains permission from the control tower to taxi, where all engines and instruments are checked furtner. He requests takeoff clearance and taxis on the runway into takeoff position. Power is applied by advancing the throttles, and the aircraft begins to roll. Prior to takeoff he will have turned into the appropriate radio aids to navigation.

When he acquires sufficient speed, he smoothly lifts the airplane into the air with full power from his engines. The copilot raises the landing gear and flaps upon command by the pilot, and then they climb to cruising altitude.

As the plane approaches the airport to land, the pilot radios the air traffic controller to obtain letdown clearance and may prepare for an instrument letdown, working with his instruments and radio and radar navigation facilities on the ground.

A pilot's job is not finished when he gets out of the airplane. He must engage in ground and flight proficiency. This work includes study of all new materials on subjects ranging from new equipment on his airplane to rules, regulations, and new data on general flying.

History and Future--Though many women hold private pilot certificates, until quite recently commercial flying was still a man's world. In 1968, Turi Wideroe became the first woman commercial pilot for Scandinavian Airlines System (SAS). Her initial assignment was SAS domestic routes as a copilot or first officer.

Among the factors that will contribute to increased air travel are population growth, greater consumer purchasing power, the trend toward longer vacations, more frequent use of air travel by businessmen, faster jet flights, and more economy-class passenger service.

Work Environment--Pilots are limited to eighty flight hours per month. Not all of the pilot's working time is spent in the air. He has preflight and postflight duties to perform and he may be on duty between segments of a flight. The Airline Pilots Association estimates that the average pilot puts in about two total duty hours to one flight hour or overall about forty working hours per week.

Training and Education--A pilot must hold an airline transport pilot's certificate from the FAA. Applicants for the certificate must be at least twenty-three years old and have a minimum of 1500 hours of flying time, including night and instrument flying. The pilot must pass a thorough physical examination and written test given by the FAA, covering such subjects as the rules of safe flying, current air regulations, and principles of navigation. He must then pass a practical test of his flight skills and technical competence. His certification remains in effect as long as he can pass an annual physical examination and the periodic tests of his flying skills required by government regulations, until he reaches his sixtieth birthday.

Qualifications--The pilot must measure up to rigid physical standards. His vision must be at least 20/100 corrected to 20/20. He must have good hearing, outstanding physical stamina, and no handicaps that would prevent quick reaction. Because flying a large aircraft imposes great responsibility on a pilot, the airlines use psychological tests to determine an applicant's alertness, emotional stability, and maturity, as well as his ability to assume responsibility, command respect, and make decisions and accurate judgments under pressure.

Advantages and Disadvantages--Pilots with administrative ability sometimes can advance to chief pilot, flight operation manager, and other supervisory and executive jobs. A few who have sufficient experience and financial backing go into business for themselves operating air-taxi services or flying schools.

Most pilots, however, spend their careers flying. For them, advancement comes in the form of seniority, which enables them to obtain the routes and schedules that pay better salaries.

Although flying does not involve much physical effort, the pilot is subject to stress because of the responsibility of the job. He must be constantly alert and prepared to make decisions quickly. Bad weather, for example, can make a flight very difficult.

Another source of potential danger that has been highly publicized in recent years is the airline hijacker. Although preventive measures, such as screening devices that are used to detect weapons concealed on passengers and sky marshals who police flights, are being employed to combat this menace, the hijacker is still a very real threat to air safety.

AIRLINE DISPATCHER

Dispatchers, employed primarily at large airports, coordinate all scheduled flights operated by an airline with assigned geographical areas. They also supervise flights to insure that Federal Aviation Administration and airline flight and safety regulations are observed. They are responsible for canceling flights and for authorizing alternate plans of operation.

The dispatcher and the flight captain must agree on all details of the flight before a plane leaves an airport. The dispatcher studies reports from the meteorologist and informs the pilot of weather conditions before takeoff. The dispatcher keeps the pilot informed of changing weather conditions and other factors that relate to the safety of the flight.

The dispatcher confers with the captain on the estimated flying time, alternate landing fields en route in case of emergency, quantity of fuel needed, and the altitude at which the aircraft will fly.

The dispatcher is responsible for keeping records, checking availability of aircraft and equipment, and maintaining proper margins of safety for the weight and balance of loaded cargo.

History and Future--Expansion of the air transport industry increases the significance of the dispatcher's job. The field is highly competitive, but depending on the rate of growth of the respective parts of the air transport industry, assistant dispatchers and dispatch clerks are expected to be hired in growing numbers. Foreign airlines operating between overseas points and cities in the United States will also increase the number of entry jobs from which future dispatchers will be drawn.

Work Environment--Air transport is not a seasonal industry; therefore, the dispatcher is not subject to lay-off due to seasonal fluctuation.

Airlines operate on a round-the-clock basis; hence, dispatchers are required to work rotating shifts with periodic weekend and holiday duty. During busy periods they may work overtime in order to cope with unusually large numbers of travelers.

Training and Education--The dispatcher must have at least a high school education. A good background in social studies will provide good background for understanding modern air transportation. It is essential for a dispatcher to be able to express himself clearly and concisely.

Qualifications--The flight dispatcher must have good health, acceptable vision, normal hearing, and a distinct, well modulated radio voice. It is preferred that applicants be under thirty-five years of age. There is no prohibition against women working in this field, but there are very few in it.

The dispatcher should have an even, pleasant disposition and be tactful and courteous in all kinds of situations. The work requires an active, agile mind; the ability to concentrate regardless of distractions; and, of prime importance, dependability and precise judgment.

Advantages and Disadvantages--Dispatchers usually receive two weeks of paid vacation a year, three weeks after five years of service, four weeks after fifteen years, five weeks after twenty years, and six weeks after twenty-five years.

The most unfavorable aspect of this occupation is the nervous strain that results from great responsibility and irregular working hours. When one considers that the responsibility of the dispatcher routinely encompasses the safety of passengers in flight, quite apart from any emergency situation that may develop, it is obvious that the emotional stability of the dispatcher must be of the highest order.

TICKET RESERVATION AGENT

The reservation agent gives customers flight schedules and fare information over the telephone.

On some of the larger airlines, data processing systems quickly receive, record, and transmit flight space information to personnel at airports and reservations throughout the entire airline system. Ticket agents sell tickets and fill out ticket forms, including information such as the flight number and the passenger's name and destination. They also answer inquiries about flight schedules and fares and keep records of tickets sold.

History and Future--Most of the major airlines are installing new machines to record and process reservations, keep records, and perform a variety of other routine tasks. Mechanization will affect the reservation clerks in particular. The employment of reservation agents, however, whose main job involves personal contacts, will not be affected very much, although their paper work will be reduced considerably. The small group of traffic representatives probably will increase substantially as the airlines compete for new business.

Work Environment--Many reservation and transportation agents belong to labor unions. Four unions cover most of the organized agents: The Airlines Employees Association International; The Transport Workers Union of America; The Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America.

Training and Education--High school graduation generally is required, and college training is considered desirable.

Qualifications--A good speaking voice is essential because reservation agents frequently use the telephone and public address system.

Advantages and Disadvantages--Reservation agents may advance to representatives or supervisors. A few may move up to city and district managers.

AIRPORT MANAGER

An airport manager must be a skilled and experienced executive; he must know the entire field of flying, especially the government regulations. It is no longer necessary, however, that he be a pilot.

An airport manager is often part landlord and part business executive. As a landlord, the safe condition and operation of the airport is his greatest responsibility. The maintenance of the airport buildings and land are also important. As a business executive, he is in charge of public relations, financial planning, profitable and efficient day-to-day operations, and coordination of airlines, concessions, and airport facilities to best serve the tenants and patrons.

His specific duties are many and exacting. He must formulate fiscal policy, secure new business, recommend and enforce field rules and regulations, make provisions for handling spectators and passengers, and see that the airport is adequately policed and that airplane and automobile traffic is regulated. Many airports offer flying instructions to the public, and the manager sometimes leases space to an independent flying school.

The airport manager must be able to serve as a businessman, safety expediter, landlord, and public relations man or woman.

History and Future--As the number of new airports increases and facilities of many existing airports expand, new managerial positions will be created. Many of these will not be top jobs. However, the airport of the future will require assistant managers or managers specializing in one part of the huge operation. Also, qualified people will replace those who retire.

The young person with determination, good college or university preparation, and varied experiences in the fields of aviation and business will find openings in this field of work.

Training and Education--A young person can begin preparing for a career in airport management in high school by taking college preparatory courses. English, mathematics, and social studies are the most important courses.

Qualifications--The major requirement for the job of airport manager is business and administrative ability. This includes the ability to make decisions, to coordinate details, to direct the work of others, and to work smoothly with many kinds of people.

Work Environment--The job of the airport manager is not one completed between nine and five. The hours are often irregular and most managers have some weekend and holiday work. They will often have to work at night. In emergency situations, they will usually work additional hours.

Advantages and Disadvantages--The position of the airport manager is the top job in most airports. An employee usually works his way up from managing various departments to becoming assistant manager and finally manager.

One disadvantage for some managers is being contacted if they are needed for consultation during their non-working hours.

PUMPMAN

The pumpman is in charge of various types of pumps. He performs several tasks including general pumping operations, transferring products to and from tank trucks and rail tank cars, pumping oil from wells, and various maintenance activities.

He maintains and operates power-driven pumps which circulate petroleum products, chemicals, and water through units during processing.

History and Future--Through the next decade, several thousand job openings are expected each year to replace workers who die, retire, or transfer to other fields.

Work Environment--The pumpman is on duty during the day shift. Work has little seasonal variation and most pumpmen have year-round jobs.

Training and Education--Most employers require pumpmen to have a high school or vocational school education.

Qualifications--Most employers prefer men who have mechanical ability and a knowledge of oilfield processes.

Advantages and Disadvantages--The work is not strenuous and offers the advantage of a fixed locale.

GAGER (PIPELINE TRANSPORT)

The gager's job is to test the amount of oil in storage tanks and to control the flow of oil from the well into the pipeline. He takes samples to test the quality of the oil for water and sediments and to remove these impurities by opening a drain at the base of the tank by using special chemical or electrical equipment.

History and Future--Most jobs created by turnover in pipeline transportation will be for professional, administrative, and technical workers, particularly chemical engineers and technicians for research and development.

Work Environment--Most gagers are on duty during the day shift; only a few work at night to handle emergencies. There is little seasonal variation and regular workers have year-round jobs.

Training and Education--Employers require new gagers to have a high school or vocational school education.

Qualifications--Companies generally hire persons who live near operating wells for well operation and maintenance jobs. They prefer men who have mechanical ability and a knowledge of oil field processes.

Advantages and Disadvantages--This type of work is not strenuous and offers the advantage of a fixed locale. Members of drilling crews or exploration parties who prefer not to travel often transfer to well operation and maintenance jobs.

ABLE SEAMAN (UNLICENSED)

The able seamen constitute about one-fiftieth of the seamen. Dry cargo and tanker vessels usually have six able seamen, two of whom are assigned to each watch. These skilled workers must have a thorough knowledge of all parts of the ship and be able to handle all gear and deck equipment. They act as helmsmen and quartermasters to stear the ship. Usually, they each take two hour turns at the wheel and, as lookouts, report sightings to the watch officer. Able seamen on passenger ships perform many of the same functions as those on freighters or tankers.

Able seamen are also responsible for rigging, overhauling, stowing, and handling cargo and other gear. They must be able to tie common knots and handle mooring lines when the ship is docking or departing. In addition to their more skilled tasks, they perform general deck maintenance work similar to that performed by ordinary seamen.

History and Future--Workers seeking employment as seamen will face keen competition for the jobs that will arise each year from the need to replace experienced seamen who retire, die, or quit the sea for other reasons.

Work Environment--Most seamen get a thirty day paid vacation each year. Some receive a longer vacation.

Accommodations for seamen are generally good but not luxurious. Meals are served in a mess hall, which often doubles as a recreation room where the crew can read, write letters, play cards, and socialize. Crewmen generally share quarters aboard older ships and have little privacy, but most new ships have single rooms.

Training and Education--No training is required to become an able seaman since the work is learned on the job. Regular and correspondence courses that may aid the worker are offered by shipowners' associations such as New York City's Seaman's Church Institute.

Qualifications--The applicant must be nineteen years of age and pass an examination to test his knowledge of seamanship and ability to carry out all the duties required of an able seaman.

Advantages and Disadvantages--Seamen who have the ability to supervise may advance to boatswain after years of service.

The seaman's days at sea are a mixture of monotony and adventure, hard work and boredom, loneliness and excitement.

MERCHANT SEAMAN (LICENSED OFFICER)

The licensed seaman is the shipowner's sole representative. He has complete authority and responsibility for the operation of the ship, including discipline, order, and the safety of the crew, passengers, cargo, and vessel.

While in port, the captain may function as the agent for the ship owners by conferring with customs officials. In some cases, he may act as paymaster for the ship. Although not technically a member of a specific department, he generally is associated with the deck department, from whose ranks he was promoted.

History and Future--Much has been acted, written, and told about the sea. It has been the setting for great romances, adventures, and mysteries.

The captain had power of life or death over his crew; his word was law. His mates administered that law in their own fashion, sometimes with the aid of belaying pins (wooden sticks shaped like policemen's clubs). Beneath the beautiful, white-spread sails of the famous clipper ships, many a seaman knew only brutality and never-ending toil.

The seaman's work today is a far cry from those of belaying pins and bullies. In clean, well-run ships seamen are protected from abuse by law and by union contract.

Some jobs for seamen will arise each year from the need to replace experienced officers who retire, die, or take shoreside employment.

Work Environment--Aboard ship, each licensed seaman has a private room with hot and cold running water, and his room is cleaned daily by a steward. The seaman eats in a dining salon separate from the mess hall in which other crewmen eat.

Training and Education--The licensed seaman must have a good background in navigation, mathematics, electronics, seamanship, propulsion systems, electrical engineering, language, history, and shipping management. He must receive a bachelor of science degree from a state merchant marine academy.

Qualifications--The applicant must present a U.S. Public Health Service certificate attesting to his vision, color perception, and general physical condition.

Advantages and Disadvantages--The life of a seaman on board ship is vastly different today from what it was thirty years ago. The modern seaman has clean, comfortable quarters and is given good substantial food. There is a union committee on every ship to arbitrate his complaints with the ship's officers. He receives fair wages, and his seniority and experience count in job and advancement priority.

Sometimes the work is hazardous because of weather conditions. Ships are lost in storms, collide in fog, or founder on rocks; seamen may be swept overboard. But for many men the lure of the sea outweighs the monotony and the danger. After a brief stay on land, they are anxious to sail again.

STEVEDORE
(CRANE LOADING)

The stevedore currently faces a period of change in the structure of his job. In the past, most cargo was stacked in break bulk form. This is cargo stacked individually on wood pallets to be stowed either by hand or lift truck inside the hold of the ship.

In recent years containerization has received more widespread use. A loaded truck trailer or rail car is detached from its chassis and attached to a winch. A loaded container can be hoisted directly aboard the ship, and the trailer or rail car is then refitted with a container of incoming goods.

Teamwork is important in this occupation. Stevedores are usually hired as members of a crew or gang under the direction of a gang boss. Having the same men work together daily increases output and decreases the chance of injury to any crew member. The size of the gang varies from area to area according to the type of cargo being handled, the machines and devices available, and the collective bargaining agreement governing work at that port.

History and Future--Among the first American stevedores were those who serviced Dutchman Henry Hudson's ship, *The Half Moon*, around 1614, The port of New Amsterdam, later called New York, was the first commercial port in America.

There are now approximately 55,000 stevedores in the United States. New York and New Orleans, the nation's two largest ports, employ the greatest number of stevedores. Other major American ports are Philadelphia, Boston, Baltimore, Los Angeles, Long Beach, San Francisco, Portland, Seattle, Chicago, Cleveland, and Buffalo.

As long as merchandise is shipped to and from our shores, men must load and unload the ships that carry it. While current employment seems fairly stable, competition for unskilled jobs of all kinds is increasing.

Work Environment--The job provides variety. The stevedore works on many different ships and may handle many kinds of goods.

The peak shipping point of early summer and early fall offers the most employment opportunities for stevedores. Some workers registered at ocean ports can expect year-round employment. Stevedores in the Great Lakes area and other inland ports face unemployment during the winter months when most shipping activity is halted by freezing conditions.

Training and Education--The work for stevedores requires no training or preparation. The job gives unskilled workers a chance to enter the labor market.

The stevedore learns his work on the job. He quickly becomes familiar with the stevedore's hook, a short, sharp tool used to manually maneuver heavy bulk cargo. Experienced workers explain the various rope and cable riggings that hoist large loads with ease. The new stevedore learns how and where to safely stow cargo in the ship's hold or on the wharf.

Qualifications--The most important characteristics the stevedore should have are alertness and a willingness to cooperate with his fellow workers. The stevedore gang members must coordinate their efforts and follow the leader's directions promptly if they are to function as a unit.

Advantages and Disadvantages--Stevedores with the talent to organize and supervise the work of others can advance to gang bosses. The boss who supervises others is normally chosen within the ranks of other stevedores.

Much of the work is done outdoors, a situation that may be pleasant in good weather and very unpleasant in bad weather. There is the ever present danger of accidents.

The U.S. Department of Labor has established safety regulations to help minimize the hazards involved in this work. These safety regulations have been supplemented on the West coast through union-employer negotiations in the form of the Pacific Marine Safety Code.